DO YOU WORK IN AN AUTOMOTIVE REPAIR SHOP?

WOULD YOU LIKE TO:

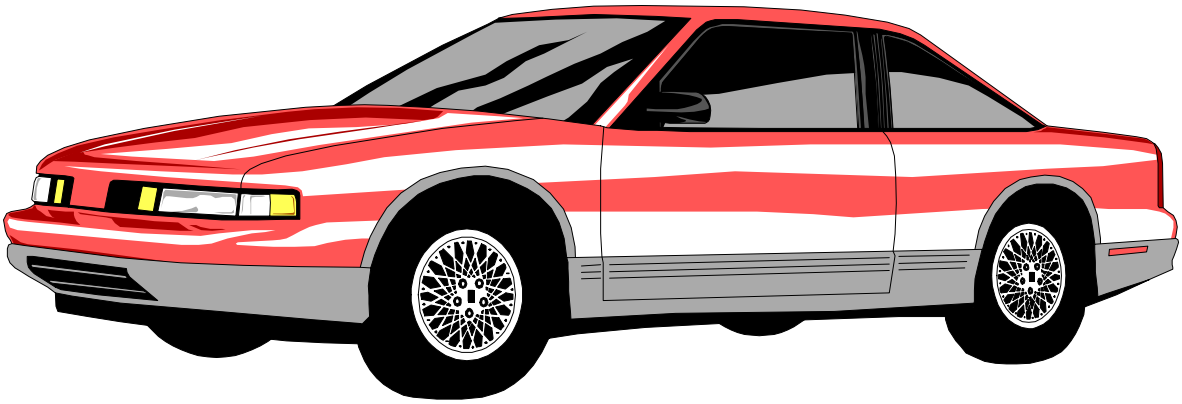
- ***IMPROVE YOUR PROFITS?***
- ***AVOID REGULATORY HEADACHES?***
- ***DO YOUR PART IN PROTECTING THE ENVIRONMENT***

Automotive Repair

Code of Practice

Reference Manual

Best Management Practices for Pollution Prevention & Pollution Prevention Award Certification.



by: The Joint Task Force of the City of Albuquerque
Public Works Department/Pollution Prevention Program and
the Albuquerque Automotive Task Force

1998

Reference Manual Table of Contents

Best Management Practices for Auto Repair Shops

Appendices A-E, are contained in the Reference Manual.

These materials are available separately upon request.

1

Introduction

This document is intended to promote a baseline of voluntary compliance practices by auto repair shops. Businesses participating will be certified by the City of Albuquerque and awarded annual recognition certificates. Recipients of these certificates will have their company's name published in local printed media. This booklet identifies options and alternatives to achieve pollution prevention goals according to the practices used in the automotive industry.

The Pollution Prevention Program is **non-regulatory** and is an educational and research tool that can provide you with information concerning methods of source reduction and pollution prevention for your business. If requested, Pollution Prevention personnel are available for on-site consultations to review your manufacturing processes and discuss methods of pollution prevention, if and where needed. The Program will also put you in contact with other non-regulatory services concerning hazardous waste and air quality, if requested.

In today's business world controlling the generation of hazardous chemicals and wastes generated from day to day operations makes good business sense.

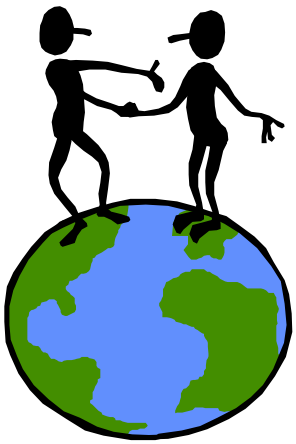
Not only will waste minimization techniques and methods save companies money, but will enhance a business's image with the public, its employees, and help a company to reduce regulatory headaches. More and more government agencies are promoting a **proactive** approach to environmental regulation. Often times if a business opts to practice voluntary compliance this effort is recognized and lauded by government agencies. Companies receive the benefit of saving money, improving employee moral, and being recognized as an environmentally conscious manufacturer. The code identifies options and alternatives to achieve pollution prevention goals for the automotive repair industry.

❒*Understanding the Code of Practice for Automotive Repair Shops*

This Code of Practice is not a regulatory document Methods, products and processes mentioned in this document are included as ***examples*** of pollution prevention techniques common to the automotive repair industry. Important appendices have been included in this booklet.

❒*The Need for the Code of Practice*

The City of Albuquerque's **Publicly Owned Treatment Works (POTW) the Southside Water Reclamation Plant** has a **National Pollutant Discharge Elimination Systems Permit (NPDES)**. Wastes discharged to surface waters are regulated under the Clean Water Act through this **NPDES** permit which sets standards for toxins and pollutants in wastewater the plant discharges into the Rio Grande. Many residents and businesses may think "***how can the small amount of paint, pesticide, or motor oil that I pour into the drain possibly cause any harm?***" According to the State of New Mexico Motor Vehicle Department in 1995 there were **453,485 vehicles registered in Bernalillo County alone. COLLECTIVELY,** every businesses or vehicle's contribution to the sanitary sewer system counts! The Southside Water Reclamation Plant is designed primarily for domestic sewage, heavy metals, oils and grease, solvents and other industrial wastes cause problems at the treatment plant, and can ultimately harm the Rio Grande The Southside Water Reclamation Plant needs your help in order to remain in compliance with the NPDES permit, and to protect the Rio Grande.



Working Together for A Better Environment.

Remember, businesses who adhere to the criteria in this Code can be certified and given annual recognition certificates for their efforts.

Participation is voluntary, but the alternative is to face potentially more direct regulation through permitting, discharge reporting, etc. **Avoiding the regulatory alternative is in everyone's interest.**

2

Source Control & Housekeeping

The most important point to remember is **control the volume of wastewater generated from your automotive repair shop**. Why do you want to control the volume of wastewater you generate?

❶The more water you use the more money it costs your company.

❷If you use lots of water you could be classified as a **Significant Industrial User** and be issued a wastewater discharge permit by the Industrial Pretreatment Section. Being under a permit means **more paperwork, more manpower, and more scrutiny**.

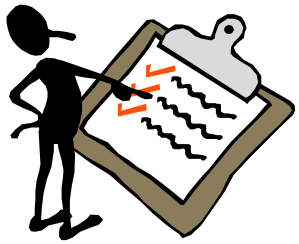
The City of Albuquerque's Water Conservation Office and Phillips Semiconductor have published a manual entitled **How to Save Water at Work**. Following are some highlights from the manual. If you are interested in receiving this valuable and useful manual call the:

Water Conservation Office at 768-3655

"Saving water will not happen automatically the first step is to

1. Enlist the full support of top management.

2. Determine where water is being used in your business and be sure to examine water use for landscaping as well.



3. Prepare a plan for saving water.

4. Start with the most obvious ways to save water:

- Fix leaks
- Install timers
- Use cold water

5. **Five Golden Rules of Water Conservation:**

- Use **minimum** amounts of water for the job.
- **Recirculate** water within a process whenever possible
- **Reuse** water.
- **Treat and reclaim** used water for additional uses.
- **Monitor** water use constantly."

Another important factor of source control is to document which chemical(s) are used in your shop and to monitor the amount of chemical(s) used in your shop. By documenting what chemicals you use and the wastes that are generated from your shop, you are taking the first steps in complying with the basic requirements of ***hazardous waste identification***, under the **Resource Conservation and Recovery Act (RCRA)**. Having a list of the chemicals you use is also a basic requirement of **OSHA** regulations.

The following information was taken from the **WRAPSHEET**, a newsletter published quarterly by the *Waste Reduction Assistance Program of the University of Tennessee's Center for Industrial Services, in cooperation with the Tennessee Department of Environment and Conservation, Winter 1997.*

The ABCs of PBTs

What you need to know about the EPA's new initiative

"PBT- Persistent, Bioaccumalative and Toxic. These words describe a host of materials that build up in the environment and can, over time, create serious environmental hazards. The U.S. Environmental Protection Agency has identified 19 "high hazard" PBT metals that will be the focus of its National Waste Minimization Plan. In Tennessee this means that TDEC inspectors will check for reduction of these metals when they review individual companies' waste minimization plans. The metals on the PBT list have been ranked according to the degree of hazard they pose. Taken into consideration are the life of the material (persistence), the degree to which it accumulates in the human body and/or the environment (bioaccumulation), and how poisonous it is (toxicity).

To make their job easer, TDEC's Hazardous Waste Management Program has identified the waste streams that contain these metals based on 1995 annual hazardous waste reports. Most of the identified waste streams produce more than one metal and several produce as many as five. "We will work closely with companies that generate PBTs to encourage them to reduce the quantity and/or toxicity of these waste metals in materials they dispose of," said Garey Marbry, manager of the Hazardous Waste Management Program. "We hope people will give these PBT wastes special attention when they review their waste minimization plans."

Voluntary program - At this point, EPA is looking for voluntary compliance from PBT waste generators to meet the national goals it has set. Those goals include 25 percent reduction in PBTs by the year 2000 and 50 percent reduction by 2005. To help Tennessee generators, the UT Center for Industrial Services will provide assistance to companies of all sizes that are looking for ways to reduce their generation of PBT wastes.

The next step This list of PBT metals is just the beginning of EPA's efforts to identify and list the most harmful materials. A list of organic compounds that are persistent, bioaccuumualtive and toxic is being compiled and should be available in 1997. "At this point we want people to be aware that reducing PBTs is going to become more and more important and to start reviewing their operations for ways they can help meet the national goal,' said Mabry."

PBT Metals

Ranked by Relative hazard from highest to lowest

1.	Mercury	10.	Arsenic
2.	Cadmium	11.	Chromium (VI)
3.	Lead	12.	Nickel
4.	Copper	13.	Zinc
5.	Selenium	14.	Antimony
6.	Silver	15.	Manganese
7.	Beryllium	16.	Aluminum
8.	Thallium	17.	Vanadium
9.	Chromium (III)	18.	Barium
		19.	Cobalt

Waste Reduction Assistance Program of the University of Tennessee's Center for Industrial Services, in cooperation with the Tennessee Department of Environment and Conservation, Winter 1997

Recycling generally carries the least amount of liability.

Remember, source control means generating less wastes. Please consider a few of the following simple suggestions to reduce some of the waste your shop may be generating.

- ☞ Using spent solvent as a stripper for cleaning grease off of small parts
- ☞ Using "old gasoline" to run a lawn mower
- ☞ Waste paint could be donated to the **Graffiti Removal Services 857-8055**
- ☞ Save money by making sure to empty all containers completely before disposal or recycling

❒ Determining What Type Of Wastes Your Shop Generates

It is crucial for businesses to document and determine what type of wastes they are

generating. By not determining what wastes your shop is generating you are putting your business at risk of stringent fines, regulatory action, and you may even be risking your health or your employees health. You can begin documenting your wastes by:

- Referring to the **Material Safety Data Sheet (MSDS**)
- Contacting government technical assistance program(s). Refer to Resource Listing, Chapter 14.
- Performing analysis of sludge wastes using the Toxicity Characteristics Leaching Procedure (TCLP), and analyzing liquids for total metals.
- **Recycle as often as possible**.

Handling Materials

- Start material substitutions or eliminations by choosing the lowest stocked item.
- Keep good records of the materials you use.
- **Mark the purchase date on** each container.
- Use first-in, first out policy.

Label all containers used in your automotive repair shop:

- With the name of the chemical
- If the chemical is hazardous
- Characteristics the chemical exhibits, for example, reactive, ignitable, corrosive, or toxic substance.
- Clearly label waste that is hazardous: **“Hazardous Waste”**
- Waste that is not identified should be treated as hazardous, unless proven otherwise.
- Ask employees to return empty containers of chemicals before giving them a new bottle or can of chemicals, to avoid unnecessary waste.
- Before adding any refrigerant to a car check the system for leaks.
- If possible, consider purchasing a recycling system to recover refrigerants.
- Store reusable fluid in a clean container so it can be put back into vehicle when repair work is done.
- Find out if your supplier will accept empty cartons.
- Purchase supplies with the least amount of packaging.

Free Could Cost You $

Everyone has heard the saying "**Nothing in life is free**". That applies to free samples too. Unless you know you will use the entire sample, "free samples" come at a price. Free samples may end up as hazardous waste, and you are responsible for their disposal as hazardous waste.

Employee Participation

Encourage employees to come up with ideas, and to look for opportunities for pollution prevention, source reduction, and waste minimization.

Employees may have some great ideas to minimize waste.

Vendor/Supplier Information

Check with suppliers for information on recycling programs, environmentally friendly products, and educational literature. A few of the major suppliers offering these type of services are **Shell Oil Company, Vavoline, and Ford Motor Company.** Sell or Give rebuildable parts to a company that remanufactures. Under the **Ford Quality Renewal Program,** engines and transmissions are exchanged and "renewed " for use as replacement parts.

Storage

Be aware that storage of hazardous and potentially hazardous materials such as gasoline, lube oil, antifreeze, and lead acid batteries may require "special notification". **Notification allows fire departments and other emergency response agencies to prepare for potentially hazardous situations.**

- Material that is stored outside should be stored in a covered area, because rain water can contaminate raw material, increase the waste you have to dispose of, and runoff may be discharged to storm or sanitary sewers.
- Chemicals or wastes should not be stored on a dirt floor to avoid ground water contamination.
- Store waste materials properly on pallets/containment systems, and check waste tanks or drums regularly for leaks or corrosion.
- A concrete floor that is diked, sloped, or recessed is best
- A storage area should have a drain valve and oil trap which removes rain water while holding petroleum products.

- Keep the area where chemicals or waste are stored locked. Securing the area provides protection from vandals, or other individuals that may want to use your storage area as a dump!☹
- Perform routine storage area inspections.
- Containers should be clearly labeled and according to the Uniform Fire Code:
- Spill prevention is extremely important according see specifications below:

Uniform Fire Code section 80.301-2 *"Floors shall be recessed a minimum of 4 inches or shall be provided with a liquid tight raised sill to a minimum height of 4 inches so as to prevent the flow of liquid to adjoining areas."*

Treating Wastes

- Keep on file the process by which you treat any wastes.
- Keep liquid wastes segregated if they are going to be disposed of as hazardous waste.
- Rags or paper towels used to clean up hazardous materials must be treated as hazardous waste and included when calculating monthly hazardous waste inventory.
- Instead of using paper towels you may want to consider using cloth rags, and have shop rags cleaned.
- Be sure to squeeze out any excess solvent or oil from the rags for recycling.

Housekeeping

- Use drip trays under leaking parts and removed parts, to allow more drainage time.
- Use spigots or funnels to minimize drips or leaks during transfer of fluids.
- If vehicle fluids must be removed outside, it is recommended to work over an absorbent mat and cover storm drains outside.
- If necessary, the use of absorbent socks can help create a bermed area.
- Reward employees for keeping bay areas clean.
- Move repair operations as close together as possible so that there is less chance of spillage, or waste from fluids dripping off of parts.

New Technology

- The Oil Bank ® is a self-contained, closed-loop system that uses pressure and

vacuum to move oil, eliminating spilling and waste. This system also reduces the amount of time to change oil, allows collection and tracking of source separated petroleum products, eliminates the need for 55 gallon barrels, and the reconditioning of the barrels. Oil Bank ® containers are available in sizes ranging from 2 gallons to 90,000 gallons. The Oil Bank ® can be used for lubricating and transmission systems. Product information is available at the back of this booklet.

Wastewater

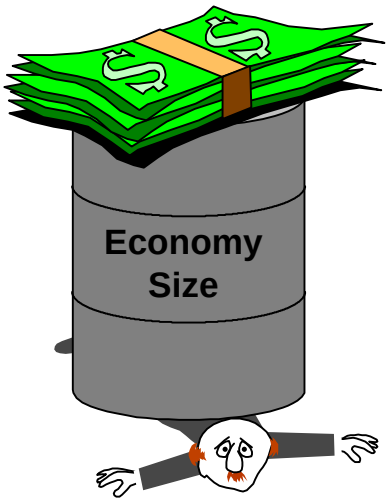
- Wastewater from engine, vehicle and floor cleaning may contain oil, solvents, heavy metals and other pollutants.
- Never discharge washwater to storm sewers. Use sandtraps for this waste:
- Pump sandtraps frequently so that the wastes don't "pass through" the trap.
- Depending on the volume of your shop, sand traps may need to be pumped monthly.
- Sweep or vacuum the shop floor frequently.
- Mop floors instead of hosing down work areas.
- Clean any spilled oils or fluids using absorbents or rags.
- Do not pour mop water into the parking lot, street, gutter, or storm drain.
- Remove unnecessary hoses to discourage washing down of floors and outside paved areas.
- Regularly sweep parking lots and areas around the facility instead of washing them down with water.
- Clean fuel or lubricant areas with absorbent instead of water.
- Shop owners may want to consider using an oleophilic mop. Oleophilic mops picks up oil but not water. Using these mops reduces the volume of waste liquids collected and the cost of disposal.

LESS IS BEST

There are many reasons for smaller purchases

- Material taken from large "Economy Size" containers can be twice as costly as material taken from smaller packages.
- Disposal costs per package can be up to 25% less for smaller containers than large containers.
- Smaller containers are emptied faster and there is less chance of chemical decomposition when using smaller containers.
- Accident risk and exposure to hazardous materials is reduced when handling small containers.
- Business liability and paperwork is reduced due to the reduction of materials being disposed. Records of all materials sent to disposal must be on file for at least three years, although the general recommendation is to maintain these records for the life of the business.
- Higher costs are associated with the handling and storage of larger containers. Additional stockroom planning and design is needed to prevent and control fires, increase ventilation, and reduce accidental spills and chemical reactions.
- Larger containers often require additional equipment such as smaller transfer containers, funnels, pumps, and labels.
- Additional labor is needed to subdivide larger containers into smaller containers.
- Additional personal protective equipment may also be necessary.

(from: "Less is Better: Laboratory Chemical Management for Waste Reduction," 2nd Ed., American Chemical Society Task Force on Laboratory Waste Management, ACS, 1993)



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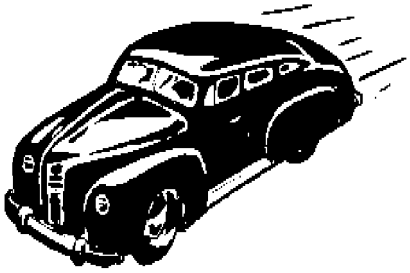
Brakes



Some brake pads may contain asbestos. Usually older vehicles have brake pads that contain asbestos, or heavy metals (particularly copper, lead, and zinc). That is why you should **Never** spray brake pads with high pressure air or water because asbestos dust may be scattered throughout your shop. Asbestos exposure may occur during replacement of clutch plates, brake pads, shoes, and linings and cleaning of brake drums and clutch housings. Asbestos fibers may become airborne when a mechanic removes the asbestos-containing residue, deposited as brakes and clutches wear. Heavy metals may be discharged either when the brake dust is picked up in a brake-cleaning solution, or when brake dust is allowed to drop to the shop floor, and is picked up when cleaning the floor. Prior to the removal of brake pads, shoes drums or rotors, aerosol brake cleaner can be sprayed over the surface to prevent brake dust from becoming airborne.

Because of the potential for mechanic exposure, new brake and clutch cleaning **methods have been mandated by OSHA (29 CFR 1910.1001**), **that are designed to reduce mechanics' exposure to asbestos**. The new requirements encourage "preferred" methods, the use of which will exempt employers from other provisions of the new standard. Either "negative-pressure enclosure/high efficiency particulate air ***HEPA** vacuum" or low pressure/wet cleaning" methods are preferred. For shops in which brake work makes up only a minor portion of the workload, the new OSHA standards allow the use of a "wet method" of control.

Shops using this method must capture any wastewater generated and properly dispose of it without allowing it to dry on any surfaces. Vacuum dust brake pads using a HEPA filter because standard vacuums will not retain asbestos dust. If possible use an airtight enclosure around the brake drum.

***HEPA** stands for an extremely fine, high efficiency particulate aerosol filtration system

The following information was taken from the EPA document EPA 560 OPTS 85-003 September 1986.

Controlling Brake Dust to Protect Your Health...

What Every Auto Mechanic Should Know:

Do clean brakes and drums with special HEPA vacuum cleaners

Do use pre-ground, ready-to-install parts when possible

Do lathe-turn brake blocks at a low speed with proper "HEPA" equipped exhaust ventilation

Do dispose of asbestos waste according to Federal and local regulations

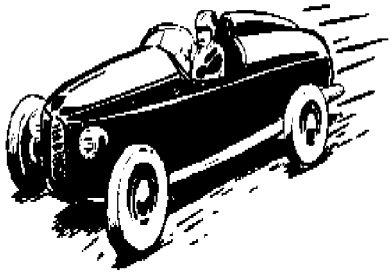
Do change into clean clothes before going home

Do stop smoking

Do wash thoroughly before eating

Don't clean with:

- air hose
- dry brush or rag
- wet brush or rag
- garden hose
- liquid squirt bottle
- solvent spray
- ordinary shop-vac
- **Don't** grind brake blocks
- **Don't** lathe, bevel, drill, or cut brake blocks without proper exhaust ventilation
- **Don't** take work clothing home
- **Don't** eat, drink or smoke in work areas



Get a running start on pollution prevention opportunities!

Cleaning Methods That Release Brake Dust Into The Air

Air Hose: **Don't blow brake dust, never use an air hose for cleaning!** This blows brake dust into the air of your garage, and is one of the worst things you can do, and this practice is now illegal. When brakes are cleaned with an air hose, invisible particles of brake dust can stay suspended in the air long after a brake job is done. Any activity in the brake work area can stir up the particles that have settled.

Controlling Brake Dust

Vacuum/Enclosure Method: A vacuum/enclosure system has a special box with clear plastic walls or windows, which fits tightly around a brake assembly. Some boxes can even fit over a brake drum. Good brake cleaning can be done without exposing mechanics or contaminating a garage. A special air gun inside the box is used for cleaning. An exhaust hose goes from the box or drum to a special "HEPA" asbestos vacuum cleaner, which

draws out and stores the brake dust. The manufacturer's instructions should be carefully followed when using this system and changing the filters or collection bags. Improper changing can release dangerous amounts of asbestos into the air.

Steps for using Vacuum/Enclosure Equipment On Drum Brakes:

- Check that the hose is securely fastened to the HEPA vacuum container and to the brake enclosure. Also check that the vacuum container seals and clips are in proper functioning order according to the manufacturer's instructions.
- Remove the wheel.
- Turn on the asbestos vacuum cleaner.
- Place the enclosure over the drum, being sure it forms a tight seal behind the braking plate.
- Place hands into the attached rubber gloves, if the enclosure is equipped with them.
- Remove the brake drum. Some equipment allows use of a hammer or other tools when needed inside the enclosure for drums that are hard to remove.
- Blow dust off the drum and brake assembly using the air gun attachment inside the enclosure.
- Clean all the inside surfaces of the enclosure towards the vacuum exit using the air gun attachment inside the enclosure.
- Remove the enclosure and turn off the vacuum cleaner.

Wet Methods. Using specially designed low pressure spray equipment that wets down brake dust and properly catches the run-off around a garage. Be sure to use only the liquid recommended by the manufacturer.

Waste. All wastes that contain brake dust must be carefully disposed of according to federal and local regulations for asbestos in a specially marked heavy plastic bag, double tied, and stored in a leak proof, airtight container designated for asbestos waste.

Machining and Beveling. Use pre-ground, ready-to-install parts. If a brake lining must be drilled, grooved, cut, beveled, or lathe-turned, low speeds should always be used to keep down the amount of dust created. All machinery should have an adequate "HEPA" equipped, local exhaust dust collection system to prevent asbestos exposures and shop contamination.

Brake Linings Should never Be Ground because this creates excess dust. Low lathe-turning will get the same job done with much less dust.

Special Areas for Brake Work. When practical, brake work should be done in a special area set apart from other work areas. No one should eat, drink, or smoke in an area where brake work is done. Smokers who are exposed to asbestos, even while they

are not smoking are at an especially high risk of getting lung cancer. If you smoke, you should get help to stop smoking. If possible, work clothes should be laundered at special facilities equipped to wash clothing contaminated with asbestos.

OSHA asbestos waste disposal regulations are covered under 29 CFR 1910(j)(2). Transport and disposal of asbestos waste should be done only by individuals familiar with procedures for handling asbestos waste in accordance with EPA's waste disposal guidance (EPA/530-SW-85-007).

Disk brake pads also contain varying amounts of copper, lead and zinc. If brake pads are not disposed of or recycled properly, the copper could end up in storm or sanitary sewers and eventually the Rio Grande. Below are some facts about brake pads taken from The Copper Problem; a document written by the City of Palo Alto's Regional Water Quality Control Plant:

Facts About Brake Pads and Pollution Prevention

- Brake pads may contain as much as 20 percent copper.
- Copper content varies from manufacturer to manufacturer. The range in one study was from below 0.625 percent to 20.5 percent.
- Copper content is not essential for good braking performance.
- Low copper and even no-copper brake pads are available for at least some models of cars.

Brake pads that contain copper present a problem, because it affects the aquatic life in the Rio Grande. Some retailers may know of a safe, low-copper or no-copper pad for your model vehicle, but this information is not always readily available. Check with your supplier for more information.

Brake Fluids & Brake Shoes

Brake fluids may contain chlorinated compounds and should be disposed of as a hazardous waste. (Brake shoes contain copper, the copper can get into the sanitary sewer or the storm sewer and if discharged to the storm sewer the copper is discharged directly to the Rio Grande, or discharged to the sanitary sewer system). Some suppliers will take old brake shoes back. Try to to find out what is done with the old brake shoes, and if possible to get a receipt for the old brake shoes. Use drip pans to catch any excess aerosol solvent that drips from the brakes when cleaning them. You may reuse solvent or ask your oil recycler if solvent can be mixed in with waste oil. Chlorinated solvents should be avoided. Buy biodegradable brake cleaners. Discourage solvent spray use for brake and clutch repair.

Brake Pads

Brake rotors can be saved and recycled. Most rotors are composed of iron, check with your supplier about what type of rotors your shop is purchasing. If the rotors are composed of iron, the machining and grindings from the rotors can be saved and picked up by a metal scrap recycler. Drum lathings may also be recycled through a local metal recycles, but be careful to keep any oil or chemicals out of the grindings.

Shocks

Shocks are composed of steel. The pistons are chromium hard steel. Old shocks contained hydraulic fluid or oil, many of the new shocks contain nitrogen gas. Most auto repair shops throw their shocks into the dumpster. Oil or hydraulic fluid should be drained from the shocks and contained for recycling before disposal.

Aerosol Cans

To increase the shelf-life of aerosol cans, keep them away form moisture, sunlight, and extreme heat and cold. It is important to keep the protective caps on the containers when not in use. This helps prevent contamination, rusting of the container top, and nozzle damage. An inventory control system can assist in reducing waste. Order products according to demand because expired shelf life may require excess inventories to be disposed.

Adapted from **Writing a Waste Reduction Plan; A workbook for motor vehicle maintenance** facilities. The University of Tennessee Center for Industrial Services Municipal Technical Advisory Service and Tennessee Department of Environment and Conservation

If your shop continues to use aerosol cans, be sure that the cans are fully discharged before throwing them in the dumpster. There are companies that sell tools to puncture aerosol cans safely, please see the vendor's list on page 19. According to federal regulations **(40 CFR section 261.23)**, "a business that has a clogged, or off-specification aerosol can is required to determine whether the contents inside the clogged or off-specification container are considered a hazardous waste; and since the aerosol can is still pressurized the entire container may be regulated as a reactive hazardous waste (the container has the potential to react violently when subjected to heat or pressure)."

Aerosol containers that are not considered empty, because of residual material and/or pressure can be a problem because federal regulations would require businesses to manage these few aerosol cans as hazardous waste even though households routinely dispose of aerosol cans as normal household trash. Information concerning recycling of aerosol cans is located on pg 20. Defective aerosol cans should be returned to suppliers.

Aerosol cans which contained hazardous substances will not be taken by many recyclers. The City of Albuquerque's Solid Waste Department requires that aerosol cans be fully discharged before land filling, which means that they should no longer hiss when the button on the can is depressed. If your company receives any defective aerosol cans,

return them to the supplier. If you have any questions about land filling aerosol cans call:

The City of Albuquerque's Solid Waste Department's Disposal Division at 836-8795

A reusable atomizer sprayer can take the place of aerosol cans containing brake cleaner. A reusable atomizer is filled with cleaner and compressed air. It is used to spray the solvent for cleaning brake parts.

Below is a case study taken from Colorado Pollution Prevention Case Studies for Auto Repair Shops by Joni Canterbury & Neil Kolwey

Automotive Repair Shop: Switch to Less Hazardous Cleaner & Reusable Spray Cans

Company	Dinstuhl's Fine Garage 2100 Pearl Street, Unit A, Boulder, Colorado 80301
Person to Contact	Peter Dinstuhl, Owner
Product or Service	Auto repair for Acura, Honda (general repairs no bodywork)
Number of Employees	8
Waste Stream Targeted	Hazardous Aerosol Cleaners
Original System	Chlorinated and Hazardous Solvents in Aerosol Cans used for cleaning brakes, carburetors, and other uses. Some of the hazardous solvents include methylene chloride, 1,1,1,-trichloroethane, toluene, methyl, ethyl ketone, xylene, and others. These solvents may be harmful to human health and may not be disposed of in a dumpster unless the aerosol cans are completely empty (all product is used and can no longer "hiss" when the button is depressed).

New System With Pollution Prevention Modifications	Disposable Aerosol Can Alternative Wurth produces a stainless steel, hand held, air powered aerosol container which can be refilled with cleaning products purchased in bulk. The unit, called a "Sharp Shooter Pressure Sprayer" comes in a variety of sizes (14 oz, 1 quart, 1 gallon) Spray nozzles can be easily changed to meet specific dispensing needs. Less Hazardous Solvent Cleaner Wurth produces a non-hazardous "Brake & Parts Cleaner" for use in the Sharp Shooter. The cleaner is a fast, efficient way to clean and degrease all brake parts (and other parts, including carburetors). Wurth Brake & Parts Cleaner does not contain any solvents which are "listed" under the hazardous waste regulations.
Cost Saving Initial Equipment Costs	Dinstuhl's purchased (6) "Sharp Shooter Pressure Sprayers" for $63.70 each or a total of $382.
Material Cost Savings	The cost of the Wurth brake cleaner is $11.50/gallon Dinstuhl's uses 10 gallons/month ($115.00/month or $1,400 year). The aerosol brake cleaner used previously costs $96 for a case of 48 cans. Dinstuhl's used ~1.5 cases/month ($1700 year) Cost Savings for the non-hazardous bulk brake cleaner is $300/year
Payback Period	Payback on the Sharp Shooter Pressure Sprayer system is approximately 1 year
Major Benefits	• Cost Savings of ~$300/year • Improved worker health and reduced liability concerns • Employee satisfaction with the use of a less hazardous cleaning solution that cleans all parts well (including carburetors). • Reduced compliance and liability concerns associated with disposal of empty aerosol cans. • Reduced solid waste generation (empty aerosol cans).
Obstacles	• Not as convenient as aerosols, propellant qualities are not as good • Employee adjustment required • Spray nozzles clog and require replacement

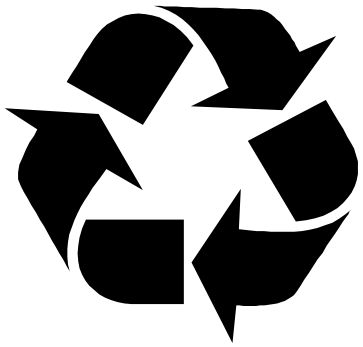
Time Since Implementation	1 year
Source/Supplier	Wurth Group of North America, Inc. Telephone: 800-346-4198 1486 East Cedar Street, Ontario, CA 91761
Main Reason Implemented	Desire to use safer products. Cost Savings
Key to success in Making this P2 Modification	Management support/commitment to pollution prevention. Vendors were helpful in supplying product information.

The following companies will take old brake shoes if you purchased the brakes from their shop, and paid a core charge. You must have your receipt for credit.

Brake Manufacturers & Distributors That Recycle Brake Shoes		
Name	**Address**	**Phone**
B&B Brake Suspension Parts Inc.	1410 2nd St. NW	1-800-648-1669
Lewis Brake & Clutch Inc	1908 1st St. NW	247-1405
Timpte Quin & McGill	1600 2nd St. NW	247-3000

Vendors that Sell Refillable Spray Cans or Atomizers			
Name	**Address**	**State**	**Phone**
Grainger	3901 Osuna Rd. NE	Albuquerque, NM 87109	505-345-8631
Milwaukee Sprayer Mfg. Co., Inc.	5635 West Douglas Ave.	Milwaukee , WI 53218	800-558-7035
Zep Manufacturing Company	2827 Girard NE	Albuquerque, NM 87107	505-884-2127

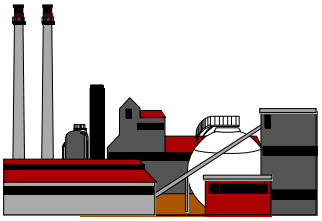
The p2 Program does not promote, recommend or endorse, any particular company or product. Vendors are listed for informational purposes only. Recycling lists may not be complete, you can request that your company be removed or added to the list by calling the **p2** Program at 873-7004.



Recycle, Reduce, Reuse

4

Solvents & Cleaning Techniques



Recent air regulations were finalized by the U.S. Environmental Protection Agency (EPA) in December 1994 concerning ***halogenated solvent cleaners***. Halogenated solvents could be present in carburetor cleaners, brake cleaners, solvents from part cleaners, thinners, and paints.

THE HALOGENATED SOLVENTS EPA IS REGULATING ARE:

- 1,1,1, Trichloroethane
- Trichloroethylene
- Perchloreoethylene
- Methylene Chloride
- Chloroform
- Carbon Tetrachloride

Other **highly toxic solvents to avoid** include:

- Chlorobenzene
- Methyl ethyl ketone (MEK)
- Xylene
- Chlorinated fluorocarbons
- Toluene

Confused with all the rules, call the p2 Office for help!

The new standard established in the **National Emissions Standards for Hazardous Air Pollutants (NESHAPS)** will require **emission controls** for facilities using any of the above solvents in total concentration greater than **5% by weight**. This is just one reason substitution of solvents may be wise. Other reasons include health

concerns and elimination of disposal costs.

Solvents serve many different types of cleaning functions in a wide variety of industrial applications. Solvents are used to remove oils, residues, waxes, greases, and particulate. Whatever the needs, the three major criteria still apply:

1) **What regulations affect your application?**
2) **What are the critical parameters this product and/or solvent must meet?**
3) **How clean is "clean" and what level of cleanliness is needed for your application?**

According to the *University of Tennessee County Technical Assistance Service Municipal Technical Advisory Service and Department of Environment and Conservation,* **Writing A Waste Reduction Plan, A Workbook for Motor Vehicle Maintenance Facilities:** In addition, "solvent parts washers produce solvent wastes that are subject to RCRA reporting. Because Petroleum distillates, mineral spirits and naphtha have flashpoints less than 140 degrees Fahrenheit, these wastes are hazardous and must be manifested. There are four main solvent mixtures used as carburetor cleaners. They are:

- Methylene Chloride and Phenol
- Petroleum Distillates and Phenol
- Methylene Chloride and Cresol
- Methylene Chloride

Most solvents currently being used as carburetor cleaners are regulated as hazardous waste. Some are regulated because of ignitability and others are listed because of toxicity.

Waste Minimization Tips for Using Solvent

- Look for the least hazardous cleaner (check product MSDS sheets).
- Many automotive shops use chlorinated solvents and cleaners. **Names of chlorinated materials contain the letters "chlor" like trichloroethane and methylene chloride.** These materials are hazardous to humans, and a very small quantity can contaminate aquifers.
- If chlorinated solvents become waste due to spills or from using them for purposes other than parts cleaning, i.e. degreasing or removing paints, it is possible that additional unnecessary waste may be generated.
- Don't stock pile solvents.Some solvents degrade when exposed to sunlight.
- Don't use solvent to clean your shop floor. If the solvent you use for cleaning the floor contains a "listed" waste, or exhibits one of the characteristics of a hazardous waste, and is discharged to your sandtrap or sump the rest of the waste in the sandtrap may become a hazardous waste.
- Solvents have been known to make their way through porous floors, (e.g. concrete) and

end up contaminating groundwater.

- Don't use expensive solvents to clean your hands. Some solvents used on hands can be hazardous to health.
- Have **one person** prepare solvent baths for consistency.
- Don't use solvent to start a stove fire. The solvent vapors may cause an explosion.
- Place your parts cleaning equipment near the service bays to reduce drips and spills.
- Degreasing equipment will need to comply with the emission control standards EPA passed in 1994. You may need to check with the:

Small Business Technical and Compliance Assistance Program(SBAP). SBAP telephone 768-1964.

The following is a case study taken from the **Nevada Waste Reporter,** published by *Nevada Division of Environmental Protection Newsletter*.

SCOTT MOTOR COMPANY

Scott Motor Company, a Cadillac, Buick, and LandRover dealership in Reno, Nevada, has recently changed their solvent purchasing and disposal methods. The results are projected to save Scott approximately $6,000 in solvent purchase and disposal costs in the next year and eliminate the generation of approximately 480 gallons of spent solvent that would have been managed as a hazardous waste. Scott Motor Co. had been hiring an outside firm to supply raw solvent and to recycle and dispose of their spent solvent on a scheduled basis. The bill for the solvent service has steadily climbed over the past 6 years. The function of the solvent used at Scott was purely for degreasing purposes; various parts are cleaned during routine servicing and repair work. In the past, Scott had four 16-gallon solvent tanks spread throughout their maintenance shop and one 30 gallon solvent tank for cleaning larger parts. Scott had the tanks changed out on a rotating basis. A total of approximately 40 gallons (the solvent tanks are not filled to the brim) of waste solvent was being changed out and replaced every 4 weeks, at a monthly cost of approximately $500.00

In 1995, Scott Motor Company purchased and disposed of 470 gallons of solvent at a cost of $6,000. They were considered a Small Quantity Generator in 1995 and had to complete numerous forms to submit their 1995 hazardous waste report. Keep in mind, Scott was contracting with an outside solvent management firm to properly haul, recycle, and dispose of their waste solvent , Scott was still the legal generator of the waste and all hazardous waste generated counted toward Scott's generator status. This generator status in turn determined the hazardous waste regulations that applied to Scott's operations.

Steve Belardes comments, "there were three main reasons Scott wanted to evaluate an

alternative cleaner: ①we wanted to reduce our generator status to Conditionally Exempt Small Quantity Generator (a business generating less than 220 pounds per month of hazardous waste) and never again have to file all those EPA forms for the hazardous waste report; ②we wanted to have more control over our solvent costs and management; and ③we wanted to find an alternative cleaner that had less of a health threat to our technicians.

Scott reviewed three different alternative cleaners that could possibly substitute for the solvent they were using. There were three criteria used in testing the substitutes

❶The solvent must have a closed-cup flashpoint greater than or equal to 140 degrees Fahrenheit (any waste with a Flashpoint of less than 140 degrees Fahrenheit is considered an ignitable hazardous waste) .

❷The solvent system must have a filtration device so the solvent is consistently filtered to remove suspended particles and contaminants, thereby extending the bath life of the solvent and;

❸The solvent system should be able to be maintained in-house, eliminating the need and expense of having an outside contractor come to the facility to check and maintain the system.

Scott ultimately selected the *SmartWasher distributed by the ChemFree Corporation* in Norcross Georgia. Steve encouraged all the technicians to try the alternative cleaner and give him feedback on whether they liked it or not. “I wanted the technicians to make the decision for Scott and not have it perceived that management was forcing it on them. I don’t use the cleaner, they do. Just because there is a cost savings for me doesn’t mean it is right for the shop.”

The only negative feedback received from the technicians was that it doesn’t clean as well on transmission fluid but that it does work, it just takes a bit more scrubbing. “The mechanics thought the positive of changing over to an alternative cleaner was far better from a health standpoint. “One trait the mechanics really liked about this system was the pressure activated pad on the front side of the solvent tank (the knee switch) that allows them to turn the system on for continuous operation, or for a cycle that shuts off after four minutes, this allows the technicians to keep both hands free to clean parts. The *SmartWasher* system costs $1,100 which includes the initial filter pad and enough alternative cleaner to fill the sink. The *SmartWasher* solvent costs $47.95 per five-gallon container and the filter pads run $7.90 a piece.

The Scott Co. bought a total of four solvent sinks their initial investment is projected to be $4,400, with make-up cleaner and filter replacement costs running approximately $416 for

the make-up cleaner and $288 for the replacement filters per year.

In 1995, Scott paid $6,000 for solvent management; in 1996 Scott is projecting solvent management costs to run approximately $5,100 which includes the purchase and maintenance of the new solvent sinks. 1996 costs should run approximately $700. Scott is projecting a payback period for investing in the new *SmartWasher* system in less than one year and reducing their solvent management costs by more than $5000 in 1997 for each year thereafter. That's only the cost savings. Scott will also be eliminating the generation of 470 gallons of hazardous waste per year, projecting a reduced regulatory burden in the years to come.

Alternative cleaning systems can still generate waste. The loaded filter pads that are changed out every month or two need to have a waste determination made on them to determine a proper disposal method. Each business is responsible for performing this test once, when they first generate a loaded filter. If the filter comes back as non-hazardous, then legally all filters generated under the same conditions, using the same alternative cleaner, can also be disposed of as non-hazardous. A business does not need to test a filter every single time they generate one. The filters need to be analyzed for the "7-11" Toxicity Characteristics Leaching Procedure which tests for the presence of 7 heavy metals and 11 organics. Instances where a loaded filter has tested as hazardous waste is when a technician has held parts over an alternative cleaning tank and sprayed some other cleaner on the part, such as brake cleaner, which contaminates the alternative cleaner in the tank. Technicians need to be trained to not put any other cleaner in contact with the alternative cleaning system.

Another waste issue is an entire batch of cleaner ever needs to be changed out. Again, the business would need to run an 7-11 TLCP.

♦ *Alternatives*

Heat (bake-off) ovens: One alternative to using solvents is using **heat (bake-off) ovens**. A high temperature oven "bakes off" grease, oil, dirt, and/or paint from parts. The oven burns off the dirt and then burns off airborne particles before release into the atmosphere. Dry ash residue left on the parts may need to be removed with a wire brush or high pressure air. A bake-off oven will produce only a small volume of dry wastes compared to potentially large volume of liquid waste. In order to avoid air quality issues it is best to use an electric powered bake-off oven. You should keep in mind that bake-off ovens have the potential to distort the shape of the part(s). The ash residue generated from the ovens may be may be hazardous, but often times the ash can be sent to a sanitary landfill.

☼ **Call the Albuquerque/Bernalillo County Air Quality Assistance Program if you have any questions about Air Quality at 768-1964**

Water based or terpene solvents: Terpenes are derived from natural sources (citrus and pine oil) and are considered to be biodegradable, nontoxic and non-corrosive. They have a low viscosity and may be used in low temperature situations. Terpenes are good solvents for heavy petroleum greases and residues, and wash away easily with water. The most common way to use terpenes is as a straight immersion bath, some baths utilize agitation to increase the efficiency of the bath. Terpenes are highly flammable when sprayed. Some terpenes will polymerize, and may form sticky threads on the solvent can or drum. An insoluble tar-like substance may form in long standing terpenes. Many terpenes are listed as **GRAS (generally recognized as safe)** material, don't deplete the ozone, and are derived from renewable resources.

Disadvantages of using terpenes include the inability to separate long-chain aliphatic oils for recycling of the cleaning solution both in neat form and in aqueous emulsions. Ultrafiltration to remove oil is not viable for recycling and only useful for treating dilute emulsions before wastewater treatment. Recycling of terpene-based solvents using existing technologies does not appear feasible. Another disadvantage is the low solubility, high cost and high volatility of terpenes, which can create problems at the wastewater treatment plant when the solvent is present in high concentrations. Terpene solvents are also highly toxic to aquatic life. You can call:

☎**Industrial Pretreatment at 873-7004 for information about discharging terpene solvents**

Emulsifiers allow non-water soluble soils to be cleaned with aqueous chemistry. Emulsion cleaners are good for removing organic contaminants

Aqueous chemistries may have emulsifying agents as an additive to help with cleaning non-soluble soils. Shops should keep in mind that parts remain wet after aqueous cleaning, and carbon steel parts rust easily in this environment. Consider installing or converting from a free running rinse to a still rinse. Installing a still rinsing tank immediately after an aqueous cleaning tank allows for cleaner recovery and lowered rinse water discharges. As water evaporates from the heated cleaning system, water from the still rinse is used as make-up. Fresh water is then added to the still rinse.

Surfactants, also known as wetting agents, can be formulated as liquids or as powders. Surfactants are used in aqueous cleaners to provide detergency, emulsification, and

wetting action. Surfactants in aqueous detergents lower the surface tension of the cleaning solution, and ensure that water drains from a part after washing.

Steam cleaning is efficient, and is good for removing heavy oil and grease loads. Operator protection from the hot steam is usually required. Steam systems can use alkaline detergents to assist with cleaning parts. Runoff from steam cleaning operations can be captured and possibly sold for fuel additive, if water from steam cleaning is kept to a minimum, and an oil/ water separator is used. However, steam cleaning of engines and parts in particular creates problems for oil/water separators. The resulting waste stream is not only hot, but soapy, interfering with coagulation and emulsification and may prevent the oil/water separator from functioning properly. Oily wastes can then travel to the sanitary sewer, coagulate and cause clogging.

♦ *Maximize Your Solvent, Minimize the Waste*

- Maximize recycling and reuse of cleaners, don't change your solution just because you think it's dirty.
- Check your solution by using a test kit or clear hose.
- In the dry cleaning industry, the level of solvent contamination, is monitored by measuring the transmittance of light through a sample of dirty solvent.

According to a **Greenlink Report *(Section 4 Category 1200)*** "work performed by the military on monitoring the quality of Stoddard solvent used for cleaning showed that light remittance, as measured by visible absorbance at 500 nanometers (itm), was a reliable indicator of contamination. Solvent replacement was required when light transmittance dropped below 25 percent".

According to the **Vehicle Maintenance Industry Pollution Prevention Handbook *(March 1993)*** from the Center for Hazardous Materials Research Technical Assistance Program University of Pittsburgh Applied Research Center:

- "Solvents are typically replaced with the sludge concentration reaches 2 to 3 percent, also most solvents are still effective with up to 10 percent solids.
- Refrain from having solvent replaced on a periodic basis, rather only when absolutely necessary to achieve the cleaning power required.
- Solvent monitoring may be performed to ensure that the solvent is only replaced when it is truly dirty."

Extend the life of the solvents by

- ♦ pre-cleaning parts with rags or brushes, using old solvent as a pre-soak to remove most of the dirt and grease, and then using a fresh bath for a final clean.
- ♦ After using this fresh bath a few times it will become the old solvent to be used as a pre-soak.

Extend the life of solvents by:

- Decanting, pouring off the liquids from a sludge that has been settled.
- Filtration, passing solvents through a filter to remove the solids.

Solvent Sinks, Parts Washers, Hot Tank Washers & Jet Sprays

A solvent sink or parts washer cleans parts more effectively and is easier to use than buckets or tanks. Solvents are less likely to spill or evaporate if you use a solvent sink. Cabinet parts washers help to save on labor costs associated with cleaning and degreasing because technicians and mechanics are free to perform other tasks while parts are being cleaned. A solvent sink contains a pump which circulates the solvents, and then may drain directly to a waste storage drum, which is safer to use than a dunk bucket or dip tank that you have to empty yourself. There are now several manufacturers and leasers of parts washers that use solvent which do not **become a hazardous waste when they are spent (flash point greater than 140 F**).

Generally, parts washers are equipped with a filter system to continuously filter the solvent during use to extend its life. See the listing on page 26. If you lease a solvent sink or parts washer, the raw material supply, tank maintenance, waste removal, and management are often included in the price of the service, however, the service can be costly. Some solvent service companies provide fresh solvent and waste removal service for equipment you own.

Caution!

Many Parts Washers have a light bulb over the tank. ***OSHA*** *regulation 1910.305(a)(2)(iii)(C)(F) states, "Lamps for general illumination shall be protected from accidental contact or breakage. Protection shall be provided by elevation of at least 7 feet from normal working surface or by a suitable fixture or lamp holder with a guard*." *If you don't have a guard over the bulb, & it breaks, the filaments could fall into the tank, & may cause a fire or explosion*.

Evaporation & Solvent Use

Solvent losses resulting from inappropriate usage, equipment leaks or spills and evaporation can range from **25 to 40%** of total solvent used. An open lid on a tank will promote evaporation, especially if the tank is heated. A sliding lid instead of one that lifts up will be more effective. Locate units away from heat sources and drafts to minimize loss by evaporation. Turn off the sink when not in use, solvent vapor may enter the shop's air if the sink is left running. Placing a plug in the drain of a solvent sink or covering the sink when not in use will help prevent evaporation.

If you use your solvent sink continuously, place a steel tray or pan next to the sink. Drain the parts in the tray for a few minutes after cleaning them and empty the solvent captured

in the tray back into the sink. Or, fit the sink with a rack or basket directly over the sink to drain parts. Removing parts from solvent baths too quickly will create splashes and allow rapid evaporation. Slow removal of parts allows the solvent to be “pulled” from the part. Draining parts properly allows the excess solvent to be returned to the reservoir instead of discarded on the floor or counter where it evaporates more quickly.

Sludge & Filters from Solvent Sinks

Recent improvements to parts cleaning machines facilitate a high solids content in the solvent reservoir while maintaining low (<1%) solids concentrations in the solvent delivered to the part being cleaned. Federal and state regulations require the spent filter sludges in the cabinet parts washer or solvent sink must be tested for hazardous waste characteristics under the 7-ll TCLP test prior to disposal. If the test results indicate the sludge to be hazardous it must be treated or disposed of properly. The disadvantages of using a parts washer are:

- ♦ It may take slightly longer to clean parts.
- ♦ It may require employee adjustment to the new cleaning times.

Hot tank washers, jet spray washers, or hot soap washers clean parts in a tank of electrically heated aqueous detergent or caustic solution. Air or mechanical agitation in the tank increases cleaning efficiency.

Jet spray washers use rotating jets which spray and clean the parts with hot aqueous solution. Some vehicle service facilities use hand-held spray guns to achieve the same effect as the closed automated units. Both hot tanks and jet spray washers need servicing periodically, the spent cleaner and sludge must be removed, the washer must be recharged with fresh detergent.

Cleaning Solutions to Use with Hot tanks & Jet Spray washers

Instead of using caustic solutions with hot tanks or jet spray washers try using detergent based compounds. Detergent based compounds work well with aluminum engine blocks, but check the cleaner to ensure that it contains surfactants that clean well, but doesn’t emulsify oil.

Agitation of detergent baths keep the solids in suspension. Prolonged periods of inactivity in detergent baths lead to the oily solids separating and settling or floating. In order to maintain solution strength of the detergent and prolong the bath’s life, the solids must be removed frequently. Ferrous metals may require caustic solutions for cleaning .

When using acidic or caustic solutions, be aware that the ***City of Albuquerque’s Sewer Use & Wastewater Control Ordinance*** requires that pH levels between 5 and 11. That means **nothing below a pH of 5 may be discharged, and nothing above a pH of 11 may be discharged** without adjusting the pH and notifying the City’s Industrial

Pretreatment Section.

Two Stage Cleaning

According to a **Waste Audit Study of Automotive Repair,** prepared by Wesley M. Toy, P.E. for the Pollution Prevention and Technology Development, Department of Toxic Substance, in California "The bulk of the oil, grease, and heavy metal residues are removed in jet sprays parts cleaning operations. In certain repair operations where there are substantial quantities of parts to be processed, a two stage cleaning operations would provide clean parts in short times by using two washing devices in series. The first device would remove the heaviest residue, and the second device would provide the finish cleaning.'Sludge from oil, grease, and other contaminants will accumulate in the washer to extend the life of the detergent, the sludge should be cleaned out frequently, and the sludge should be analyzed (TCLP) in order to determine if the sludge is hazardous or non-hazardous.'"

Solvent Recovery

Spent solvent and aqueous parts cleaning solutions can be recovered by distillation, and aqueous waste volume can be reduced by evaporating and concentrating sludges Based on the results of California Department of Health Services assessments (California, 1987a), the **low volume of solvent typically used at most small to medium repair operations does not justify the added expense of on-site, solvent recovery equipment and maintenance costs**. For larger operations that generate greater volumes of solvent, labor costs to operate equipment and additional costs for disposal of water residues are not competitive with current solvent sink lease and maintenance service operations. **Given the poor economics, increased liabilities and regulatory requirements**, **using solvent recovery equipment may not be the best management practice.** According to the **Waste Audit Study of Automotive Repair,** "Only **when there are substantial volumes of solvents to be recycled is there a payback,** for example Firm C, who generates 2,200 gallons/month of solvent." ***Mesa Environmental*** will take **non-chlorinated waste solvent** for **fuel blending**, if the generator provides a **Toxicity Characteristic Leaching Process (TCLP**) laboratory analysis showing the spent solvent to be non-hazardous waste, **with a flashpoint above 207 degrees Fahrenheit**. **Non-chlorinated waste solvent with a flash point below 207 degrees Fahrenheit is considered a hazardous waste** and Mesa Environmental will not accept it. See the back of this manual for Mesa Environmental's phone number.

Another case study from **Colorado Pollution Prevention Case Studies for Auto Repair Shops by Joni Canterbury & Neil Kolwey**

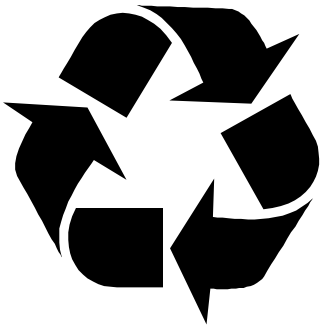
Company	**All Tune & Lube** **2100 Pearl, Unit B, Boulder, Colorado 80301**
Person to Contact	David Rosenblatt
Product or Service	Auto Repair
Number of Employees	6
Waste Stream Targeted	**Hazardous parts cleaning solvents, solvent wastes**
Original System	**Conventional, Stoddard Solvent Parts Washer**. A sink-type device dispenses solvent from a faucet and collects and recirculates the spent solvent in a drum beneath the sink. A cleaning brush is included as an accessory or as part of the faucet. Stoddard-based solvents (mineral spirits or petroleum naphtha) typically have a flash point of ~105 degrees Fahrenheit (highly flammable). *(Class II Combustible Liquid flash points are above 100 degrees Fahrenheit and below 140 degrees Fahrenheit.)* The parts-washing solvent is removed and manifested for shipment off-site as hazardous waste, and the parts washer is refilled with fresh solvent.

Company	**All Tune & Lube** **2100 Pearl, Unit B, Boulder, Colorado 80301**
New System with P2 Modifications	**Profile Plus Parts Washing Detergent** is used in a sink-type unit similar to conventional parts washers. The detergent solution is heated for better cleaning effectiveness, and the solution is collected in a drum beneath the sink and recirculated. The parts cleaner has a filtering unit that removes grease and solids to allow for product reuse. A cleaning brush is included as an accessory. Profile Plus parts washing detergent is a non-alkaline, aqueous, non-toxic, nonflammable cleaner especially designed for use in heated parts cleaners. ~1 quart is added every 4-6 weeks to maintain the solution's cleaning effectiveness. Sludge settles out in the bottom of the container of spent cleaner and must be removed ~once per year. The sludge will be analyzed the first time it is removed, to determine if it is a hazardous waste. If not, it can be disposed of with other non-hazardous absorbent material. (This has not been done yet because the sludge is still accumulating in the tank.)
Cost Savings **Initial Costs**	All Tune & Lube purchased the Water Star parts cleaner for $800.00. An initial analysis of the sludge generated will cost ~$200.
Operating Cost Savings	Requires purchase of 2 gallon ($31.00/gallon) of Profile Plus per year (~$62.00 per year) and (2) 30-lb bag of Oil Gator for ~$60.00 per year ($122 in total material costs per year). The Safety Kleen Solvent parts washer and solvent replacement service costs ~$105.00 every 7 weeks or ~$780.00/year. **Cost Savings of ~$660.00/year**
Payback Period	**About 1.5 years**

Company	**All Tune & Lube** **2100 Pearl, Unit B, Boulder, Colorado 80301**
Major Benefits	• **Cost Savings of ~$660.00 /year** • **Reduced hazardous waste generation** and associated regulatory requirements and liabilities. • Reduced worker health and liability concerns associated with parts washer use. • Employee satisfaction with the use of a less hazardous, low odor parts cleaning solution.
Obstacles	• Initial **equipment cost of $800**, however Water Star Inc. Offers a time **payment plan for equipment purchase**. • Parts cleaning may take slightly longer
Time Since Implementation	7 months
Source/Supplier	Water Star Inc. 314 K.S. Peoria, #257 Aurora, CO 80014 Sales Rep: Ted Watrous Telephone 303-337-1905
Main Reason Implemented	Reduce hazardous waste generation and associated costs, improve worker health and safety.
Key to Success in Making this P2 Modification	Vendor information on new parts washers and parts cleaning products.

Vendors that sell Hot Soap Washers or Solvent Sinks		
Name	**Address**	**Phone**
American Metals Wash, Inc.	5100 Edith Industrial Blvd. Minneapolis, MN 55439	612-835-5811
Bio T Parts Washer, Golden Technologies Inc.	15000 W. Sixth Ave., 202 Golden, CO 80401	303-239-7758
Bioforce/Oxisolv Parts Washer		303-369-5215
Grainger	3901 Osuna Rd NE Albuquerque, NM	505-345-8631
Hotsy Cleaning Systems, Inc.	3100 Northwest 101st. Street Des Moines, IA 50322	515-278-8800 or 800-798-8800
Landa Water Cleaning Systems	13705 NE Airport Way Portland, Or 97230	800-547-8672 or 505 255-5980 FAX: 800-535-9164
Lewis Corporation	102 Willenbrock, Oxford, CT 06478-1033	203-264-3100
NAPA Auto Parts Store	1510 2nd St. SW Albuquerque, NM	505-848-3500
Paul M. Wessel Co.	1203 Eighteenth Ave. P.O. Box 3East Moline, IL 61244	309-755-2195
Safety-Kleen	2720 Girard NE, Albuquerque, NM 87107	505-884-2277
Water Star Inc.	314 K.S. Peoria, #257 Aurora, CO 80014	303-337-1905

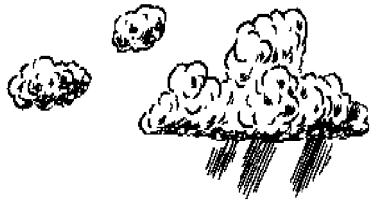
The U.S. General Services Administration (GSA) publishes a catalog that contains hundreds of commercially available cleaning supplies, ranging from soaps and disinfectants to mops and buckets. The February 1995 edition of the catalog introduced a **13-passage section devoted to biodegradable cleaners and degreasers, including 48 cleaning and degreasing products from 30 suppliers. Call 800-241-7246** to request the most recent catalog.

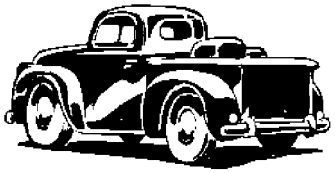


Reduce, Reuse, Recycle

5

Washing Vehicles





You may not think that something as simple as washing a vehicle could generate chemicals or wastes harmful to the environment, but it can be. Washing a fleet of vehicles can become an a impediment if the water is discharged to storm water drains, or if the discharge contains heavy metals or toxic chemicals that may be difficult to treat at the **primarily biological wastewater treatment plant.** In fact, **discharging vehicle wash water to storm sewers is a violation of the Clean Water Act**. Washing vehicles may generate potential contaminants in the form of detergents, cleaners, sediments, oil and grease. Even some biodegradable soap is toxic to fish and wildlife. Before discharging a large amount of waste water used to wash a fleet of vehicles to the sanitary sewer, you should call the **Industrial Pretreatment Program at 873-7004**

Mobile Power Washing may also be a concern. Much of the information on Mobile Power Washing was taken from an article written by Robert M. Hinderliter (1195, Delco Cleaning Systems of Forth Worth). The following study is an excerpt from that document. “In 1993 in Forth Worth, Texas the Department of Environment Management tested over 560 storm water sites within the city of Forth Worth. Detergent was discovered in over 50% of these sites making detergent the most encountered pollutant in the City. It was determined that cosmetic cleaning was a significant source of these detergents. ”If you are the owner of a mobile power washing system it is most economically feasible is to recycle the wash water for a short period of time and then discharge it to the sanitary sewer.

A variety of products are used to wash a car, such as, detergents, tire dressing, and acid based wheel cleaners to remove dirt and grime. Washing a fleet of vehicles outdoors in areas where wash water flows to pavement or a storm drain can lead to storm water pollution, if the water is not pretreated for contaminants before discharge.

- If possible, slope a *designated vehicle washing area* and collect the waste water for pretreatment.
- The *designated vehicle washing area* should be bermed to protect ground water and storm water sewers.
- Any shop that may wash many vehicles and does not have a pretreatment system may want to consider taking their vehicles to a commercial car wash that can treat the wastewater properly.

Car Washing Products

Car washing products that **do not contain phosphates, petroleum based surfactants and persistent surfactants** are desirable. Phosphates cause problems because they promote algae growth, which depletes the oxygen in the surface waters and may end up killing fish when discharged to the Rio Grande. Avoid using acid based wheel cleaners because these products may require additional treatment beyond oil/water separation. As stated before, even biodegradable soap can become a problem because it takes time for these soaps to break down and the soap may emulsify oils, grease, fats, dirt, pesticides and insecticides. Oil and grease are not easily treated by the wastewater treatment plant and they can cause severe operational problems. A greasy scum layer builds up in digesters used for sludge and cost several thousand dollars to remove. Products that have a neutral pH (7.0) used at recommended concentrations are desirable.

Whenever possible, vehicle washing should be done indoors and the facility should be equipped with adequate pretreatment equipment (oil/water separator) before discharge to the sanitary sewer.

The following tables were taken from ***Controlling Vehicle Service Facility Discharges in Wastewater***: Prepared under the direction of the Pollution Prevention Committee. Water Environment Federation 1995.

U.S. Postal Service Vehicle Washing Methods (Northeastern Area)			
Wash Method	**Description**	**Approximate Water Use**	**Comments**
Handwash	Washing with buckets, sponges, soap and water (garden hose)	30 gal/vehicle	Well suited to small vehicles and small fleets
Pressure Wash	Typically portable equipment with trigger controlled wand for soap and water application	7 gal/vehicle	Flexible in vehicle size/number and washing location
Dry Washing	Spray on application, wiping and buffing with dry cloth	No water	Applicable only above freezing temperatures; well suited to small vehicles and small fleets; soiled rags may need to be laundered or land filled
Drive-through Mechanical Washer	Vehicles pulled through a mechanical washer on a fixed track		Well suited to small vehicles with normal wheel base
Rollover-type mechanical washer	Mechanical washer passes over stationary vehicle		Well suited to a variety of vehicle sizes

Washing off site at a commercial vehicle washing facility is another option that results in zero discharge. The logistics involved in the transport of vehicle to the off-site location should be evaluated. Currently, outside washing with no discharge to surface water or groundwater can be accomplished most economically by a contractor that collects wash water on a mat.

The following table is costs for different washing methods:

U.S. Postal service Vehicle Washing Options and Costs (Northeast Area)						
Discharge location/Wash Method Inside Structure or Outside	Contractor vs U.S. Postal Service	Treatment	Capital	Annual	Present Worth	Cost/Wash
Pressure Wash on Portable Mat (outside)	Contractor	Collect and pretreat	N/A	$32,500	$220,000	$6.00
Hand or Pressure Wash Over Catch Basin (outside)	U.S. Postal Service	Retrofit Catch basin And Pretreat	$25,000	$30,000	$200,000	$5.50
Hand or Pressure Wash Over Catch Basin (outside)	Contractor	Retrofit Catch Basin And Pretreat	$25,000	$18,000	$125,000	$3.50
Hand or Pressure Wash With Wash Bay (inside)	U.S. Postal Service	Pretreat	N/A	$30,000	$200,000	$5.50
Hand or Pressure Wash In Wash Shed (inside)	U.S. Postal Service	Pretreat	$45,000	$30,00	$250,000	$7.00
Mechanical Washer (inside)	U.S. Postal Service	Pretreat	$75,000	$18,000	$195,000	$5.50
Closed loop Recycle/Mechanical Washer	U.S. Postal Service	Advanced	$100,000	$21,000	$235,000	$6.50
Wash At Off - Site Facility (Zero Discharge)	Contractor	N/A	N/A	$25,000	$170,000	$.4.75

Based on 300 washes of typical postal delivery vehicle per month.
Based on 10 years at 8%
Cost per wash based on 10-year present worth

Guidelines for Inside Washing Of Vehicles

- Discharge wastewater after pretreatment with an oil/water separator
- Know the limits for discharges to municipal sewer system

- Maintain regular inspection and cleaning schedules for oil/water separators and maintain records on site for at least 3 years or as long as required by state regulations
- If excessive oil and grease buildup requires cleaning of the oil/water separator more than once per year, evaluate the effectiveness of biological treatment to reduce cleaning frequency

Guidelines for Outside Washing Of Vehicles

- Eliminate discharges to surface waters or ground water.
- Avoid outside washing, and try to use contractors capable of pretreating wash water.
- Choose an area where water will be contained on your property
- Always use shut-off nozzles attached to leak-free hoses and connectors
- Use brushes and scrapers to remove heavy deposits
- Explore water less technologies.

Guidelines for Mobile Power Washers

- Wash in the customers wash bay or pump your wash water to the wash bay sand trap.
- Wash vehicles on a portable vinyl wash pit or in a designated area that has been bermed to contain the wash waters.
- Pretreat used wash water with a 200 micron dirt and sand filter or carbon filters.
- Try using cold water for washing. Hot water emulsifies oil and grease.
- Pass wash water through an oil absorbent boom or pad to absorb hydrocarbons.
- Try using a recycling unit to clean the wash water enough so that the water is suitable for washing but not rinsing. Normally, recycling units do not remove detergents, total dissolved solids or heavy metals. This means that your detergent usage will decrease.
- If you do primarily cosmetic cleaning you should be able to recycle for one or two days and still stay under sanitary sewer discharge limits with filtration and absorption technologies.
- The longer you use the recycled wash water, the harder it is to rinse off, even though you are using a fresh water rinse.
- Recycle the wash water only long enough so that it is still within the sanitary sewer's discharge limits.
- Avoid heavy degreasing, acid or two step washing, heavy brushing or aluminum brighteners.
- The least expensive method of collecting your dirt, sand, and debris is off of your wash surface, before entering your wash water pumping equipment.
- You may let the dirt, sand, and sludge dry and leave for the customer to put in his dumpster. Anything taken to the land fill must pass the sand filter test so it must be as **dry** as possible

☞Owners or operators of coin-operated car wash operations should be especially careful. If a customer uses one of your wash bays as dump area for antifreeze, oil, transmission fluid, or any other engine fluid, you could be left with a **hazardous soup** that you have to

pay to haul away. Even though you may not have created the hazardous mess you are still **responsible for disposing of any hazardous material, and you may end up paying a large fee for disposal.**

Guidelines for Coin Operated Washes

- **Post signs stating that when hazardous materials are dumped customers pay for it in the form of increased prices**
- If possible, have **accessible "recycling" drums** for waste engine fluids.

Even charity car washes must operate with the guidelines of a City of Albuquerque issued permit. The permit stipulates that no water flows into streets, storm drains, arroyo or neighboring property. For permit information call:

Water Waste
Car Wash Permits
768-3650

Recycling Systems For Mobile Power Washers:

Delco Clean Systems of Fort Work

2513 Warfield St., Fort Worth TX, 76106

817-625-4213

Delco also offers

Vehicle Compliance Manual

BY: Blymyer Engineers, Inc

Mobile Fleet Washing:

Bright Knight Enterprises

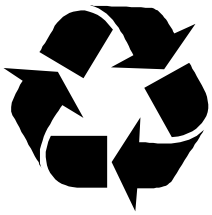
P.O. Box 54149

Albuquerque, NM 87153-4149

505-299-1903

Fax 505-293-3151

The City of Albuquerque does not promote, recommend, or endorse any particular company, product, or technique. If you would like your company to be added to this list call, the **p2 Program** at 873-7004.



Reduce, Reuse, Recycle

6

Oil/Water Separators & Sandtraps

Many shops use oil/water separators and sandtraps to pretreat their wastewater before discharging it. Using an oil/water separator, in many cases, allows a business to reclaim and reuse a percentage of their wastewater.

Some of the other benefits of oil/water separators are they can reduce a businesses contribution of chemical oxygen demand to the wastewater treatment plant thereby reducing the chance of regulation and surcharges. A percentage of the waste water recovered from the separator can be reused for cleaning purposes. Oil water separators can be set up as staged treatment systems, for example the

- **First stage** is settling
- **Second stage** may be a coalescing separator;
- **Third stage** is usually a sand filter. At this point, the water has passed through the 3 stages and can be reused for cleaning.
- **Fourth** and final stage would be some type of membrane or filtration treatment.

Alkaline, or quick splitting cleaners are best when using an oil/water separator. Most auto shops settle on two stage treatment, settling, and the coalescing unit. This two-stage treatment costs approximately $1,600 to $2,000 for a unit.

The following information was provided by ***SAGE technical***:

Oil in water can be categorized into 5 categories with different treatment technologies possible. The categories are:

Free Oil

- Droplet size larger than 150 microns
- Will Separate in a 6" high beaker in less than 2 minutes

Dispersed Oil

- Droplet size is 20 microns to 149 microns
- Will separate in a 6" high beaker in less than 2 minutes

Mechanically Emulsified Oil

- Droplet size is less than 10 to 20 microns
- Will not separate in a 6" high beaker in 1.5 hours

Chemically Emulsified Oil

- Droplet size is less than 10 microns with Surfactants or emulsifiers present in the water
- Will ***not*** separate in a 6" high beaker in 1.5 hours

Soluble Oil

- No discernible droplet size and the ions are cross linked in the water
- Will **not** separate in a 6" high beaker in 1.5 hours
- Some soluble oil solutions are non-separable regardless of treatment. This is true of most synthetic oils.

Multiple category solutions **do** exist and can require various treatment technologies, including combinations, depending on the level of removal required."

Because of the multiple category of oil/water solutions that do exist the following is a discussion about the various types of oil/water separator solutions. This information was taken from the **Oil/Water Separator Handbook** *by Kambrell Stevenson Travelstead presented by Edison Steel Products, Inc.*

"The simplest continuous flow gravity separator is a long pipe through which the oil/water mixture flows. By providing a long enough pipe and slow enough flow, enough time can be given for all of the free hydrocarbons in a mixture to float to the top of the

pipe. This is the concept on which all gravity separators are based. Most oils are lighter than water and will rise to the top of an oil water mixture."

Types of Oil/Water Separators

API Separators

The API separator consists of a rather long and shallow chamber through which the oil/water mixture passes. The velocity of the mixture is relatively low so that the oil can rise to the top of the water and collect. Oil is removed through a skimmer as water flows from the downstream end of the unit.

- **Advantages** are the unit is relatively simple and cost effective. This design is capable of producing rather clear water at the outlet. API separators have relatively low maintenance costs.

- **Disadvantages** are that the API unit is intended to remove oil droplets of 150 microns in diameter or larger. This may not be sufficient to allow the effluent to meet most current environmental standards. For very effective removal of oil, a very long unit is required.

Semipermeable Membranes

A membrane composed of a material which will pass oil or water but not pass water/oil may be used in the mixture stream. The oil will be removed downstream/upstream of the membrane and water will collect up/down stream of the membrane for removal.

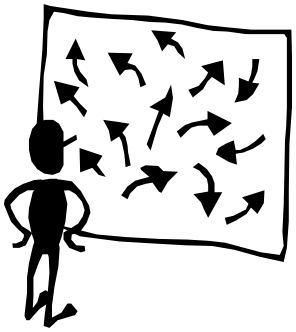
- **Advantages** of a membrane system is that it can be very effective in separating oil from water.

- **Disadvantages** of a membrane system is the cost and the maintenance needed in order to prevent plugging. Some means must be provided to determine contamination of the membrane.

Chemical System

The chemical system utilizes chemical additives to react with oil in water and reduce the oil to a non-contaminating chemical, or free the oil from a chemical bond.

- **Advantages** of the system are that it is capable of removing almost all oil from the mixture regardless of droplet size. The unit can be used in-line



Are you confused about waste, the City has several organizations that can help your company!

in a steady flow water system.

- **Disadvantages** are that chemicals must be provided and the reactions monitored. The unit is not capable of handling very large flow rates. Best performance is found with oil/water mixtures containing low concentrations of oil.

Coalescing Plate System

This system utilizes a properly designed series of stacked horizontal plates to aid in joining together small oil droplets. The smaller the droplet size, the slower the droplet rises to the surface of the water. The vertical plate spacing is calculated based on flow and rise rate to capture a minimum droplet size. The very small droplets gather together on the underside of each plate and naturally “coalesce” or join together to form larger droplets. The newly formed, larger droplets flow down stream into the main separator tank, and rise rapidly through the oil/water mixture to be collected at the top.

- **Advantages** of coalescing plates are they increase the efficiency of the traditional API design. An API separator with coalescing plates is considerably smaller than a simple API separator of the same capability. Coalescing plate technology will work with continuous or intermittent flow. Maintenance is simple, amounting to occasional cleaning.

- **Disadvantages** are that very careful design of the coalescing pack is required, knowledge of influent characteristics, flow rates, specific gravity, droplet rise velocity, sedimentation and numerous other variables.

Inlet Deflection Plate

The deflection plate is a flat or patterned plate mounted in front of and perpendicular to the separator inlet.

- **Advantages** are, by presenting an obstruction in the influent path, the plate slows flow and as a result allows more contact time.

- **Disadvantages** are by directing flow against an obstructing vertical surface, turbulence is introduced into the effluent. Adding turbulence inhibits the ability of droplets to coalesce. In severe cases, turbulence can cause existing oil droplets to shear, or even to form an emulsion. Any dimpling or patterns in the plate adds additional turbulence by delaminating flow across the surface.

Spirex Tube

This device, is a patented coiled, perforated inlet. This slows the inlet flow velocity without adding turbulence to the influent.

- **Advantages** are, that the tube provides a gentle means of slowing product flow at the separator inlet. This prevents shearing of droplets that already exist, and promotes a gentle environment favorable to coalescing from the inlet.

- **Disadvantages** are required maintenance of the system.

Before using or investing in a oil/water separator consider what type of containment vessel you will be using for storing the oily wastewater and where it will be located. Do you want to use an underground storage tank, or an above ground storage tank? Contact the proper authorities before making a decision. The City of Albuquerque and Bernalillo County have recently enacted the **Ground Water Protection Policy and Action Plan (GPPAP)**. The policy identifies three high priority common sources of contamination: hazardous materials and waste storage facilities, underground storage tanks, and septic systems. GPPAP relies on the Uniform Fire Code to protect the ground water without requiring additional regulation and regulators. The Fire Department can provide valuable information about the storage and handling of hazardous materials. If you have any questions about storage of wastes call:

Albuquerque Fire Department
Fire Prevention Bureau
888-8121

Additional Considerations For Purchasing An Oil/Water Separator:

- Characteristics of your liquid. Evaluate your oil/water mixture and the contaminants in the liquid that you are trying to process.
- Know the flow rate and flow conditions that are found on your site. Most oil/water separators are based on flow rate.
- Find out discharge requirements, know both federal and local regulations.
- When checking requirements, also find out if discharge limits are due for changes. If so consider whether the oil/water separator can meet future regulations.
- Is the vessel used for the storage of the oil or petroleum products designed to protect not only the water resources but also the soil?
- Can the oil/water separator be maintained with minimal effort to ensure that the performance is not affected? Maintenance includes the inspection of the filter media, removal of excess oils and removal of settable solids.
- Does the manufacturer provide accessories for access and removal of the oil and for monitoring the oil level.

- Does the manufacturer provide man way access to the vessel for inspection and maintenance.
- In most oil/water separator applications, it is necessary to monitor the oil level within the tank. This is most often accomplished using float sensors, which alarm at pre-set levels to indicate that a certain volume of oil has been reached.
- Also important to oil/water separator performance is the use of equipment prior to the oil/water separator. i.e. catch basins, drop-out boxes and grit tanks.
- Preprocessing of the wastewater removes contaminants such as gravel and silt which may compromise the performance of the oil/water separator.

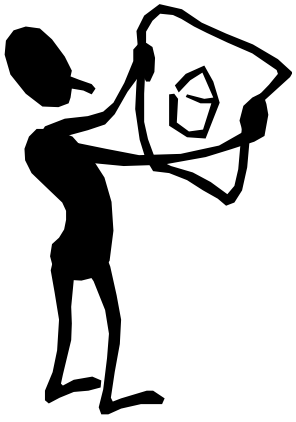
Adapted from the article "Oil/Water Separators: Design, Regulation and Use" by Thomas D. Aldrige, Jr. Fluid Containment Inc. **Environment Technology** *January/February 1997*

It is imperative that oil/water separators be maintained properly. According to a case study done by the City of San Bernardino Water Department in California, "Interviews with shop supervisors and service managers indicated that waste antifreeze, general cleaning solvents, and carburetor cleaners were washed down drains daily, along with dirt and grease from engine cleaning and maintenance. Materials testing in the drain indicated levels of copper, lead, zinc, and hydrocarbons exceeding local limits for metals and other toxins. **Levels were measured of up to 100 mg/L of toxic metals and 70,000 mg/L of Chemical Oxygen Demand (COD**). Additional testing showed that methylene chloride and xylene were present."

SandTraps

Sandtraps and Grease traps aid in retaining sand, silt, grit, mineral material, petroleum solvent, grease or oil from being discharged into the sanitary sewer system. It is very important to pump sand traps on a regular basis. If they are not maintained properly, they don't work properly, and the sand, silt, grit, and petroleum products flow straight through the sandtraps and into the collection system.

- Sandtraps should not be used as a **Catch-All**.
- **Sweep up!** You will conserve water and cash if you sweep instead of spray.
- **Never** put any metal grindings into your sandtrap.
- What type of products are used to clean the floor? Are any of the products hazardous?
- If the cleaner used on floors exhibits any hazardous characteristics and is being washed into the sand trap, you could be creating a hazardous waste headache!
- Post signs above your sandtrap explaining what **should not** be dumped into the sandtrap.
- Antifreeze, solvents, oil, and transmission fluid should never dumped into



Considering installing a oil/water separator?

a sandtrap.

- You should use a qualified, permitted, hauler to pump your sandtrap.
- Find out where the hauler is taking the wastewater.
- You should always receive a manifest or a receipt for the waste that the hauler is taking.
- The sludge in the sandtrap should be cleaned out periodically, or your sandtrap will not function properly.
- The sludge from the sandtrap should be tested using the TCLP to ensure it is not hazardous. If the sludge is **not hazardous it can be dried and landfilled**.
- Some haulers have facilities with drying beds for doing this, but make sure the hauler has a permit for drying beds.
- The sludge from the sandtrap must be dry enough to pass the *paint filter test* before being landfilled.
- You should **check the sandtrap before and after pumping** in order to ensure that it is completely pumped.
- You can check sludge level by using a ruler.
- Check the yellow pages under septic tank haulers for vendors that offer sandtrap pumping services.

Sandtraps shouldn't be used as a dump for chemicals or petroleum based fluids
According to the ***City of Albuquerque's Sewer Use & Control Ordinance***, *section 6-3-2-18, Oil and Grease Discharge Limitations:*

The Industrial Waste Engineer shall monitor city wastewater discharge permit holders, ***automotive shops, vehicle fueling stations, septic tank pumpers, transporters****, and others as appropriate. Existing sources* ***must maintain their traps and separation-treatment systems to insure that grease and oil does not enter the public sewer****. New sources must install systems as approved by the Code Administration Planning Department to meet the discharge concentrations. Section 6-3-2-13 states that dischargers not in compliance shall also be subject to appropriate treatment works operation and maintenance costs, necessitated by the oil and grease problem, until the problem is corrected.*

Albuquerque Fire Department	Bernalillo County Fire Department
Fire Prevention Bureau	Fire Prevention Bureau
2510 Quincy NE	6840 2nd St. NW
Albuquerque, NM 87110	Albuquerque, NM 87107
881-8124	761-4225

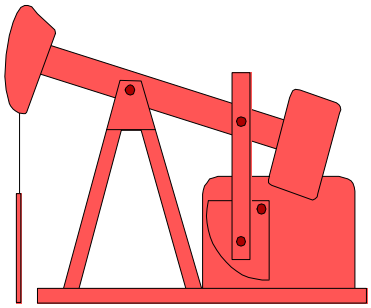
The following organizations provide standards for oil/water separation systems:

AMERICAN PETROLEUM INSTITUTE

MANUAL ON DISPOSAL OF REFINERY WASTES
OIL/WATER SEPARATOR PROCESS DESIGN
API BULLETIN NO1830
WASTE WATER TREATMENT MANUAL FOR PETROLEUM MARKETING FACILITIES
PHONE#202-682-8000

7

Recycling Oil Wastes



The generator remains ultimately responsible for the proper disposal of waste. It is critical to be aware of classification requirements. **Disposal of hazardous waste is forever, generators of hazardous waste are responsible for the waste from "cradle to grave." Make sure that any recycler you use has an EPA ID number, and is reputable, and if possible, visit the recycling facility.**

"Used oil doesn't wear out it just gets dirty"

Motor Oil

A car's engine oil picks up concentrated levels of potentially toxic elements such as **arsenic, barium, cadmium, chromium, copper, lead, phosphorous, magnesium and zinc**. All of these elements in large volumes can cause severe damage at the wastewater treatment plant. Oil films on water surfaces can block sunlight and impair plant photosynthesis that increased oxygen for aquatic life.

- One gallon of used oil from a single oil change can pollute a million gallons of fresh water.
- It takes 42 gallons of crude oil to produce 2.5 quarts of new lubricating oil.
- One gallon of used oil can be re-refined into 2.5 quarts of useable oil. *(City of Golden, Environmental Services Division)*

The EPA has classified used oil (hydrocarbons) as non-hazardous if it is destined for recycling, refining, reprocessing or burned for energy recovery. **After emptying grease and oil containers, clean out residual oil or grease and reuse for parts cleaning**.

3 Options for Waste Oil

1. Recycling or Re-refining:
Waste oil can be re-refined into fuel oil or lubricating oil. One gallon of used oil provides 2.5 quarts of lubricating oil the same amount as 42 gallons of crude oil. Hydraulic oils used in agricultural and industrial machinery can be cleaned and used again. When recycling oil, it should not be mixed with brake fluid, water, or chlorinated solvents.

2. Burning for Energy Recovery:
The United States Environmental Protection Agency considers the burning of waste oil to be a form of recycling, because burning the oil recovers the heat value of the oil. A special waste oil burner must be used. The burner must be under 500,000 Btu per hour capacity. A person can only (a)burn their own oil (b)used oil received from other households, and (c)used oil which is received from a registered oil marketer and which meets quality specifications and is not a hazardous waste.

3. Product Manufacturing:
Used oil is used in products such as roofing shingles and asphalt. In recent years, oil filtration units have been developed that filter and blend used diesel crankcase oil for supplementing diesel fuel.

Management Standards for Used Oil

Taken from **Managing Used Oil; Advice for Small Businesses** *EPA530-F-96-004 November 1996*:

Storage

- Label all containers and tanks as “Used Oil.”
- Keep containers and tanks in good condition. Don’t allow tanks to rust, leak, or deteriorate. Fix structural defects immediately.
- Never store used oil in anything other than tanks and storage containers. Used oil may also be stored in units that are permitted to store regulated hazardous waste.

Oil Leaks or Spills

- Take steps to prevent leaks and spills. Keep machinery, equipment containers, and tanks in good working condition and be careful when transferring used oil. Have sorbent materials available on site.
- If a spill or leak occurs, stop the oil from flowing at the source. If a leak from a container or tank can’t be stopped, put the oil in another holding container or tank.
- Contain spilled oil. For example, containment can be accomplished by erecting sorbent berms or by spreading a sorbent over the oil and surrounding area.
- Clean up the oil and recycle the used oil as you have before it was spilled. If recycling is not possible, you first must make sure the used oil is not hazardous waste and dispose of it appropriately. All used cleanup materials, form rags to sorbent booms, that contain free flowing used oil also must be handled according to

the used oil management standards. Remember, all leaked and spilled oil collected during cleanup must be handled as used oil. If you are a used oil handler, you should become familiar with these cleanup methods. They may also be part of a spill response action plan.

- Remove, repair or replace the defective tank or container immediately.

Recycling Tips

- Oil additives sometimes contain chlorinated components. Keeping chlorinated products out of your used oil is important in maximizing recycling options.
- Some recyclers will test for chlorinated products and will refuse to recycle the oil, or charge more for recycling the chlorine-contaminated oil.
- Buy motor oil in bulk to reduce costs, trash, and oil waste.
- Purchase reusable, absorbent pads that will allow oil to be squeezed out into a waste oil drum.

Some recyclers allow used motor oil to be mixed with transmission oil, brake fluid, non-chlorinated solvents, non-chlorinated aerosol solvent, compressor oil and hydraulic oil. **Check with the recycler that you use for oil for specific procedures, and to find out if they will if they recycle transmission oil, brake fluid, or compressor oil, or hydraulic fluid.** Many companies will take these oils if they are **non-chlorinated.** Never pour transmission fluid down the drain or into the storm sewer as it may contain lead and other toxic heavy metals.

The following story was taken from **Environmental Waste Control Digest,** *Public Works for January 1997*

A WIN-WIN DISPOSAL IDEA

"Last winter a waste oil heater was installed in a Canadian County maintenance building where heavy mowing and road repair equipment was serviced. The 6,500-sq ft facility is in El Reno, Oklahoma, about 25 miles west of Oklahoma City.

The heater, a Reznor 350,000 Btu waste oil furnace (Thomas & Betts Corporation, Memphis, Tennessee), is fueled by fluids drained from the vehicles housed in the facility. The heater also solved the problem of how best to dispose of the waste oil in an environmentally responsible manner. Modern waste oil heaters offer the ability to burn multiple types of fuel without the hassle of constantly readjusting the unit. The El Reno unit burns a mixture of several different fluids.

'The heater will take any petroleum based product-gear oil, or motor case oil, for example- and burn it for heat' said Stanley Wallace, District 1 Canadian County

Commissioner. ‘These can be blended as they’re drained from vehicles. ”The heater is able to handle this mixture, provide reliable heating, and still easily meet the standards of the Clean Air Act.

Wallace said the heater not only cut fuel bills by an impressive 65 percent, it also eliminated expensive, time-consuming trips for many area residents. Ranchers and farmers who use agricultural machinery have had to transport their waste oil to Oklahoma City or pay a hauling company to collect and dispose of it for them. ‘Now people have a location where they can deposit their waste oil on a weekly basis,’ he said. ‘We have constructed a 10,000 gallon storage tank for this purpose. ”Each Wednesday residents can bring their waste oil to the facility where it is tested to make sure it does not contain unacceptable fluids.

The heater, which is set on 70 degrees, burns about 2.5 gallons of fuel an hour. ‘The waste oil unit has become our primary heating source,’ said Wallace, who learned about the heater while reading a trade journal. ‘Our existing natural gas heating unit now is our secondary backup. This system has cut our facility’s electricity and gas usage by 40 to 60 percent. It will mean a continual savings on my energy costs in the facility a savings in the vicinity of $3,000 to $5,000 a year.’

Savings such as these mean the waste oil heater will pay for itself in about two years. In fact, Wallace is so pleased with the heater, he hopes to purchase more and place them at other locations.

The EPA’s National Risk Management Research Laboratory and the Alaska Health Project conducted a study of **Waste Oil Reduction for Diesel Engines** (EPA/600/SR-96/-92). The study found that:

❶”Oil change intervals can be extended beyond engine manufacturers’ warranty recommendations without oil degradation. To ensure protection of the engine while extending the OCI, field monitoring of oil condition is recommended. To monitor oil quality in the field, a portable, battery-powered comparative dielectric analyzer (CDA) was found to be easy, inexpensive, and a good indicator of oil degradation. There is a consistent relationship between CDA readings and total base number (total base number is an indicator of oil buffering quality) levels in measuring oil degradation. However, each engine and situation is unique. Therefore, Oil Change Interval extensions based on CDA response should be correlated with laboratory analysis for each engine, lubricating oil and fuel type.

❷Oil samples from stationary diesel engines that used bypass filters showed no less oil contamination than control samples. Other studies have revealed that oil change intervals can be extended when using bypass filters, but they had no control data.”

Used Oil Do Not's

- **Do Not Pour Used Oil Down A Drain**
  If the drain leads to a wastewater treatment plant, the oil could reduce plant efficiency, causing more contaminants to flow out of the plant's discharge pipes and nearby river, lake or stream. At its worst, oil clogs plant machinery and may cause an unscheduled shutdown. **Repairs are an expensive and avoidable use of taxpayer dollars.** The effect is similar when oil is poured down a drain that leads to a septic system. The oil can hinder or stop the biological processes that make the septic system work.

- **Do Not Pour Used Oil Into A Storm Sewer**
  Storm sewers lead directly to lakes, streams, rivers, and wetlands where oil spoils habitat for fish and wildlife, and interferes with swimming, boating, and other recreation. Pouring oil down a storm sewer is illegal.

- **Do Not Toss Used Oil On The Driveway, Street or Ground**
  Such practices lead to soil pollution and through percolation and runoff, can contaminate lakes, streams, wetlands, and ground water.

- **Do Not Spread Oil To Suppress Dust Or Kill Weeds**
  These practices harm land and water resources.

- **Do Not Dispose of Oil in Lakes, Streams, Wetlands or Rivers**
  It's illegal and harmful to fish, wildlife and outdoor recreation.

- **Do not Burn Outdoors**
  Burning oil in a backyard barrel can result in toxic smoke that contaminates the air you and others breathe. Many municipalities have ordinances that outlaw such burning.

Adapted from: Recycle Used Oil, Wisconsin Department of Natural Resources

Oil Filters

Presently, New Mexico does not require that oil filters be recycled. Oil Filters can be land filled in New Mexico but **36 other states do** require recycling. Recycling and crushing of filters may be in New Mexico's future. Oil filters might be contaminated with toxic metals, but can be recycled and become non-hazardous if they are drained using the hot drain method. Avoid purchasing terne-plated filters. Terne-plated (terne is an alloy of lead and tin) oil filters may fall under requirements of hazardous waste regulation. The Filter Manufacturers' Council maintains a regulatory hotline and database to encourage the proper management of used oil filters. By calling the hotline

at 800 99-FILTER, you can access the proper management requirements for your particular state. The database contains:

- Overviews of federal and state regulations relevant to the management of oil filters.
- Addresses and phone numbers of regulatory agencies governing the management of used filters in each state.
- A listing of companies, by state, that transport, process, and recycle used filters.

Drain oil filters by emptying the filters at near engine operating temperature and at least 60 degrees Fahrenheit. Filters emptied in this way are considered to be non-hazardous. Oil Filters can be **evacuated** several different ways:

① Puncturing the filter's dome end or anti-drain back valve and hot-draining.

② Hot draining and crushing the filter.

③ Dismantling and hot-draining the filter.

Used oil filters contain up to 5 ounces of oil after they have been drained for 24 hours. Puncturing the filter around the base will allow some of the trapped oil to escape and be collected. If possible, use drip rack and allow 24 hour gravity draining of used oil filters. Draining filters at the point of removal prevents handling of filters still containing oil. Filter crushers which remove 80-100% of the free oil are available, and the collected oil should be recycled. Many **NM Highway Department Maintenance facilities have heaters that use waste oils.**

"Even if your business follows EPA guidelines for proper disposal of used oil filters, you will not be completely free from potential liability. **Used oil filters (even when punctured and hot drained) contain small amounts (3-8 ounces per filter) of used oil, which contains small amounts of hazardous substances (i.e. lead)**. If your company were to ship wastes, containing as little as a molecule of hazardous substance, to a site which later requires remediation, you can be held responsible for all or part of the cleanup costs."[1]Some companies that recycle oil filters charge more if the filters are not crushed, and some companies will crush the filters for your company. Ask the recycler you use for their specifications. Small quantities of filtered waste oil can be used in fuel mixtures for 2-cycle engines. It can also be blended with fuel oils and in specially designed burners, used for heating applications."

Reusable Oil Filters & By-Pass Filters

Taken form FOCUS Waste Minimization, DPPEAFleet Maintenance Volume 6, No. 1
NC Department of Environment Health and Natural Resources.

Eliminate/Reduce Oil Changes with By-Pass Filters

[1] **FirstRecovery™** Professional Environmental Services *FR-39-96*

“By-pass filtration is becoming a proven technology that significantly extends oil and engine life and reduces engine problems and vehicle maintenance costs.

Background

Oil itself does not “break down,: i.e., it does not lose its lubricating capability. Oil changes are necessary because water gets into the oil, additives deteriorate, and contaminants build up. All three contribute to increased engine wear Vehicle engines are usually equipped with full-flow filters to remove particles from the oil that are typically 40 microns and larger in size, e.g.,. grit. The most damaging contaminants , however, are particles less than 10 microns in diameter. In addition, full flow filters do not remove other contaminants such as water, fuel , and gases.

By-Pass Filters

The by-pass filter does not replace the full flow filter, it is installed in addition to and in parallel with it. With the by-pass filter, approximately 10 percent of the total oil flow is diverted through the by-pass filter in continuous cycle. In this superior filtration system, the by-pass filter cleans the oil by removing particles even less than 1 micron as well as the detrimental water, fuel and gases. Since the contaminants are removed, the oil will no longer need to be changed. However, oil may need to be added to replace the amount lost during engine combustion and filter replacement. Contaminant removal with the by-pass filter has proven to extend engine life. In addition, by-pass filters are easily transferable between vehicles at vehicle replacement.

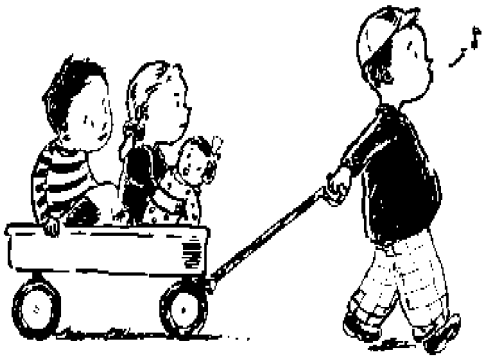
Although the oil itself will no longer need to be changed, the filters (both full-flow and by-pass) will need to be changed periodically. A current test on one diesel fleet that was near the 100,000--mile point without an oil change shows that the full-flow filters need to be changed about every 40,000 miles and the by-pass filters about every 15,000 miles. As supported by periodic oil analyses, these intervals may continue to be increased and, thus, oil filter replacement, and disposal costs continue to be reduced.

The society of Automotive Engineers reported a successful 12-year study on the use of by-pass filters in school buses that resulted in an 80-percent reduction in oil usage. In addition, several Florida school buses equipped with the by-pass filter have equipped with the by-pass filter have gone 5 years without an oil change. By-pass filters have been used in critical-service marine engines for several years, including those of the major oil companies.

A 1991 test of by-pass filters on heavy-duty, on-highway trucks resulted in an increase in oil drain intervals from 16,000 miles to an average of 94,000 miles (as supported by periodic oil analyses), an 83 percent reduction in oil consumption, and a payback of one year.

Reusable Oil Filters

Reusable oil filters eliminate oil filter inventory and disposal costs. Reusable full-flow filters are similar in size and shape to the disposable full-flow filters commonly used. However, the reusable filter contains a metal media instead of the typical paper medica. This metal media can be removed and cleaned quickly and easily and then re-installed in the same filter housing. The cleaning process, which involves circulating or soaking the filter in a cleaning fluid and then blowing it with compressed air, typically requires only as much time as a disposable filter change. Reusable filters cost- $60 to $300 depending on the size of the filter. With the reusable full-flow filter, oil still needs to be changed routinely, although the intervals between changes may be extended with oil analysis. Reusable by-pass filters are also available."



Follow us to waste minimization opportunties!

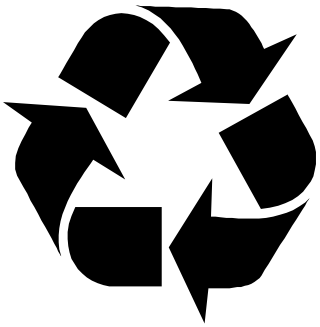
By-Pass Filter Vendors			
Filter Manufacturer	**Address**	**Telephone#**	**Filter Applications**
AMSoil	2429 Win Rd. Garner, NC 27529	919-850-6564	Engine Oil, Hydraulic, Transmissions, Synthetic lubricants
Enviro Filtration, Inc	4719 Roosevelt Gary, IN 46408	800-368-4763	Engine Oil
Filmax	1835 Edward Dr. Library PA 15129	601-832-1553	Engine Oil, Hydraulic, Coolant, Transmission, Transformer Oil, Solvents
Gulf Coast Filters, Inc.	PO Box 2787 Gulfport, MS 39505	601-832-1663	Engine Oil, Hydraulic, Air Compressor Oil, Natural gas engines/turbines
Pall Hydraulics Corp.-Racor Div.	2200 Northern Blvd. East Hill, NY 11548	516-484-5400	Engine Oil, Hydraulic, Transmissions
Parker Hannifin Corp. Racr Div.	PO Box 3208 Modesto, CA 35353	800-344-3286	Engine Oil, Hydraulic, Coolant, Transmission, Power Steering
Premo Plus		910-295-6164	Engine Oil
Rio Bravo	Laredo TX	210-791-7061	Oil Guard Engine Protection System - Engine Oil
T.F. Purifiner	Atlanta, GA/Henderson, NC	770-455-8298 ext 18	Engine Oil, Hydraulics, Transmission

Companies That Recycle Oil Filters		
Name	**Address**	**Phone**
American Resource Recovery Ltd.	PO Box 306, Maywood, IL 60153	800-841-6900
Blue Maxx	PO Box 887, Detroit Lakes, NM 56502	800-551-2583
CDR Oil Filter Recycling	2566 Ivanhoe Rd. Cedar Rapids, IA	319-366-3561
E&E Enterprises	PO Box 683, Brownfield, TX 79316	800-658-2137
Mesa Oil	20 Lucero Rd. Belen, NM 87002	1-800-873-3645

Companies That Recycle Oil Filters		
Procycle	320 Scoggins Rd. Springtown, TX 86082	800-252-6444
Safety-Kleen	2720 Girard NE, Albuquerque, NM 87107	505-884-2277
Southwest Oil Recyclers	7405 Oakland Ave. NE, Albuquerque, NM 871113	505-821-2863

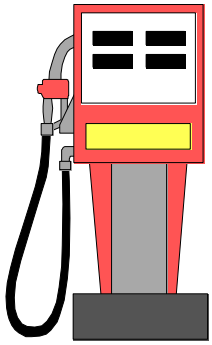
Reusable Filter Vendors			
Heintz Brothers automotive, Inc.	1475 Old Mountain Rd. Statesville, NC 28677	704-872-8081	System One Filter Systems
Parker Hannifin Corp.- Racor Div.	PO Box 3208 Modesto, CA 95353	800-344-3286	Engine Oil, Hydraulic, Coolant, Transmission, Power Steering

The City of Albuquerque does not recommend, endorse, or promote any particular company, product or manufacturer. This tables above may not be complete, call the **p2** Program to add or remove your company from the list at 873-7004.



Recycle, Reuse, Reduce.

Fuels



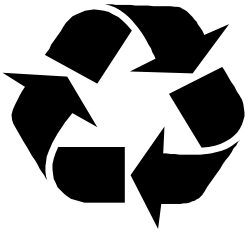
Fuel your company with pollution prevention ideas!

Gasoline: The **Toxicity Characteristics Rule**, issued by RCRA has been revised, the list of RCRA hazardous wastes now include substances associated with automobiles. Benzene is the most common of these newly regulated substances. **Benzene is found in most petroleum fuel** products and automotive additives such as crankcase oil brake, power steering fluids and degreasers.

You can **Use "waste" gasoline** in lawnmowers and other small engine applications that can tolerate lower quality or off-specification fuels. Blended fuel mixtures for 2-cycle engines can be used in weed eaters, leaf blowers, some motorcycles, boat motors, and chain saws. Donate "waste" fuels to other who may have a use for them, such as: boat and motorcycle repair shops, civic government organizations such as garden clubs, park departments, and schools. If reasonable care is taken to prevent water and particulate contamination, most fuels can be reused. Minor contaminant problems can be "fixed" by using additives (it blends with the water like commercial de-icer fluid) and filtration.

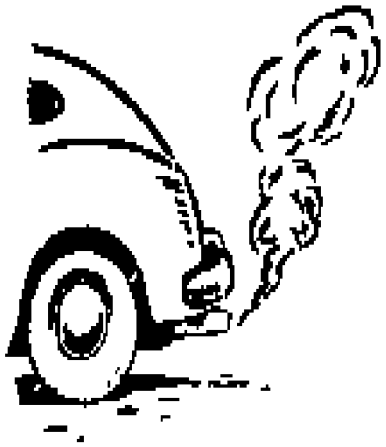
Diesel Fuel: Generally, diesel fuel is unaffected by age. Because of the small diameter of injection nozzles, most applications can not tolerate particulate contamination. Filtration is the best method for "fixing" this problem. Again, use this fuel in more tolerant applications. It can also be used in certain heating applications designed for such fuels.

Fueling of Vehicles: Waste fuel spills from fueling or transfer of fuels to storage tanks can be sources of pollution. Fuels carry contaminants of particular concern to humans, fish, and wildlife. Fuels may contain heavy metals, toxic materials, oil and grease none of these contaminants are easily removed by wastewater treatment plants. Fuels are combustible, and if washed into storm or sanitary sewers can create toxic or flammable conditions. Split fuels may contaminate groundwater or evaporate and cause air pollution. If possible, fueling area should be paved with Portland cement concrete rather than asphalt, which can disintegrate when exposed to fuel leaks and spills.



Recycle, Reuse, Reduce

Safety Note: Carbon Monoxide and Nitrogen Oxides are gases that exit vehicle tailpipes. Both of these gases are toxic in very small concentrated doses. Carbon Monoxide can kill you by taking the place of oxygen in your blood. Nitrogen Oxides affect your health over a longer period of time. Evidence also suggests that hydrocarbons, diesel soot, and even gasoline vapors are possible causes of lung cancer. To minimize exposure to these deadly gases, use an exhaust ventilation system that attaches to the vehicle tailpipes or use a floor fan to direct the gases away from the service bay work area.



Protect your health!